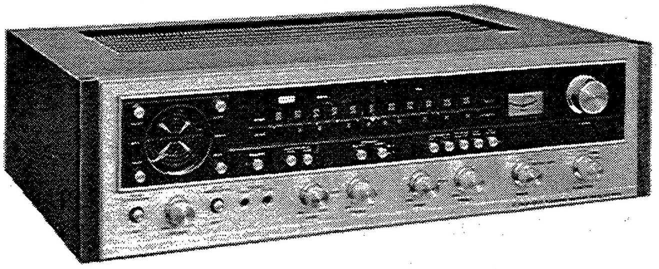
4-CHANNEL STEREO RECEIVER

QX-747A

F

<ART-141-0>

Service Manual



PIONEER®

CONTENTS

1. SPECIFICATIONS 1
2. FRONT PANEL FACILITIES 3
3. CONNECTION DIAGRAM 5
4. LEVEL DIAGRAM 8
5. BLOCK DIAGRAM 9
6. CIRCUIT DESCRIPTION
   - 6.1 FM Tuner Section 11
   - 6.2 AM Tuner Section 11
   - 6.3 CD-4 Demodulator Section 13
   - 6.4 SQ Full Logic/RM Decoder Section 17
   - 6.5 Control Amplifier Circuit 20
   - 6.6 Power Amplifier Section 21
   - 6.7 Protection Circuit 21
7. DISASSEMBLY 23
8. ADJUSTMENTS 25
9. PARTS LOCATION 29
10. DIAL CORD STRINGING 39
11. EXPLODED VIEWS 40
12. SCHEMATIC DIAGRAMS, P.C. BOARD PATTERNS AND PARTS LISTS
   - 12.1 Schematic Diagram and Miscellaneous Parts 49
   - 12.2 Headphone Jack Assembly (AWX-054) 54
   - 12.3 Tuner Assembly (AWE-056) 55
   - 12.4 Control Amplifier Assembly (AWG-024) 61
   - 12.5 Switch Circuit Assembly (AWS-087) 64
   - 12.6 Protection Circuit Assembly (AWM-079) 68
   - 12.7 CD-4 Assembly (AWM-076) 71
   - 12.8 SQ/RM Decoder Assembly (AWM-077) 79
   - 12.9 Power Supply Circuit Assembly (AWR-086) 85
   - 12.10 Power Amplifier Assembly (AWH-028) 88
13. PACKING 94
14. PARTS LIST OF EXPLODED VIEWS 95

1. SPECIFICATIONS

Semiconductors

FETs	7
ICs	10
Transistors	90
Diodes	65

Amplifier Section

Continuous Power Output from 20 Hertz to 20,000 Hertz	
(4 channels driven)	20 watts per channel (8 ohms)
	25 watts per channel (4 ohms)
Continuous Power Output from 20 Hertz to 20,000 Hertz	
(2 CHANNEL POWER BOOSTING SWITCH set at "2 CH")	
(2 channels driven)	40 watts per channel (8 ohms)
	50 watts per channel (4 ohms)
Continuous Power output at 1,000 Hertz	
(4 channels driven)	25 watts per channel (8 ohms)
	30 watts per channel (4 ohms)
Continuous Power Output at 1,000 Hertz	
(2 CHANNEL POWER BOOSTING SWITCH set at "2 CH")	
(2 channels driven)	45 watts per channel (8 ohms)
	55 watts per channel (4 ohms)
Circuitry	Direct Coupled Complementary OCL
Total Harmonic Distortion (20 Hertz to 20,000 Hertz)	
(Continuous Rated Power Output)	No more than 0.5%
(1 watt per channel Power Output, 8 ohms)	No more than 0.05%
Intermodulation Distortion	
(Continuous Rated Power Output)	No more than 0.5%
(1 watt per channel Power Output, 8 ohms)	No more than 0.05%
Output, Speaker	FRONT: A or B REAR: A
Headphones	FRONT & REAR: Low impedance
Damping Factor (1,000 Hertz, 8 ohms)	35
Input Sensitivity/Impedance	
PHONO	2.4mV/50 k ohms
PHONO Overload Level (rms)	100mV
TAPE PB (2CH, 4CH)	140mV/100 k ohms
Output Level	
TAPE REC (2CH, 4CH)	140mV
Frequency Response	
PHONO (RIAA equalization)	30 Hertz – 15,000 Hertz ±1dB
AUX, TAPE PB	10 Hertz – 24,000 Hertz $^{+0.5}_{-1}$ dB
Tone Control	
BASS	±10dB (100 Hertz)
TREBLE	±10dB (10,000 Hertz)
Loudness Contour	
(Volume control set at −40dB position)	+6dB (100 Hertz) +3dB (10,000 Hertz)
Hum & Noise (IHF, Short-circuited, A Network)	
PHONO	70dB
AUX, TAPE PB	90dB

CD-4 Demodulator Section

Input Sensitivity	2.5mV (1 – 5mV adjustable)
Input Impedance	100kΩ
Distortion	0.15%
Signal-to-Noise Ratio (IHF, A Network)	70dB
Separation (STD Test signal at 1kHz)	
Left ~ Right	50dB
Front ~ Rear	30dB

FM Tuner Section

Circuitry		1 MOS FET, 1 stage RF Amplifier, 4-ganged Variable Capacitor, 5-stage Limiter
Usable Sensitivity (IHF)		1.9μV
Capture Ratio (IHF)		1dB
Selectivity (IHF)		60dB
Signal-to-Noise Ratio		70dB
Image Rejection (98MHz)		80dB
IF Rejection (98MHz)		100dB
Spurious Rejection		100dB
AM Suppression		55dB
Harmonic Distortion	Mono	0.2%
	Stereo	0.4%
Frequency Response		20Hz – 15kHz $^{+0.2}_{-2.0}$ dB
		50Hz – 10kHz $^{+0.2}_{-0.5}$ dB
Stereo Separation	1kHz	40dB
	50Hz – 10kHz	30dB
Sub-carrier Suppression		65dB
Antenna Input		300Ω Balanced, 75Ω Unbalanced
Muting		ON–OFF
MPX Noise Filter		ON–OFF

AM Section

Circuitry	1 Stage RF Amplifier, 2-ganged Variable Capacitor
Sensitivity (IHF, Ferrite Antenna)	300μV/m
(IHF, Ext. Antenna)	15μV
Selectivity	35dB
Signal-to-Noise Ratio	50dB
Image Rejection	40dB
IF Rejection	55dB
Antenna	Built-in Ferrite Loopstick Antenna

Miscellaneous

Built-in CD-4 Demodulator, Regular Matrix Decoder, SQ Full Logic Decoder

Power Requirements	AC 110, 120V, 130V, 220V and 240V (Switchable) 50/60Hz
Power Consumption	340W
AC Outlets	Unswitched 2, Switched 1
Dimensions	550 (W) x 160 (H) x 420 (D) mm 21-8/16 x 6-5/16 x 16-9/16 in.
Weight: Without Package	19.1kg (42 lb 3oz)
With Package	23.6kg (51 lb 15oz)

Furnished Parts

FM T-type Antenna	1
CD-4 Test Record (PQX-1014)	1
Fuse 4A	1
Fuse 2A	1
Operating Instructions	1

NOTE:
Specifications and the design subject to possible modification without notice due to improvements.

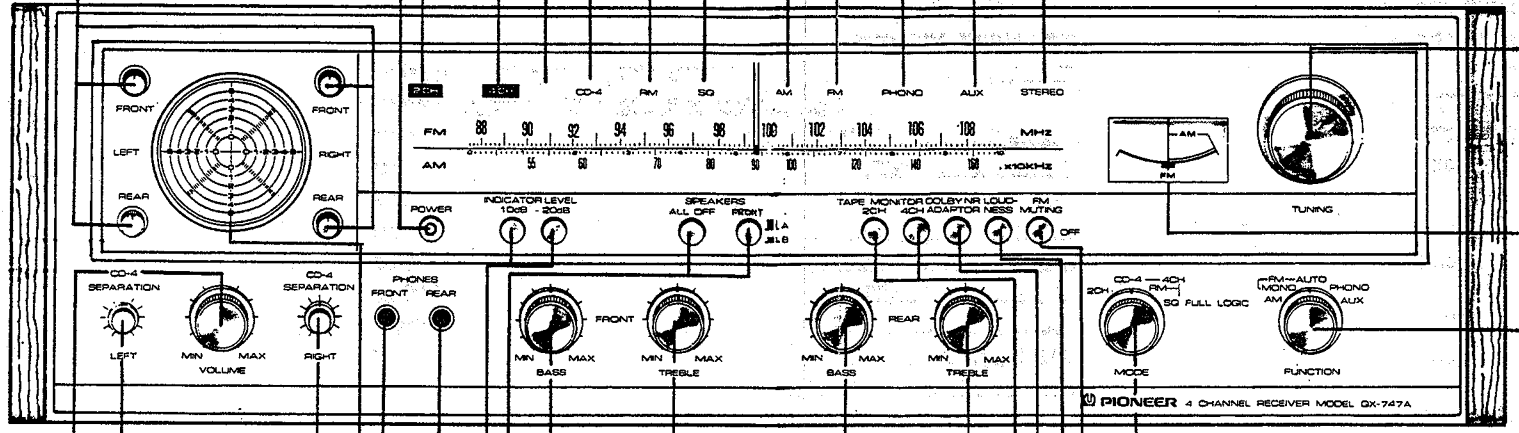
2. FRONT PANEL FACILITIES

POWER SWITCH

Push button switch for turning on AC power. Also activate switched AC outlets on rear panel. Depress once for power ON; depress again for power OFF.

BALANCE CONTROLS

Individual balance controls for each of the four channels.


2CH
4CH
CD-4
RM
SQ
AM
FM
PHONO
AUX
STEREO
FRONT
LEFT
REAR
FRONT
RIGHT
REAR
FM 88 90 92 94 96 98 100 102 104 106 108 MHz
AM 55 60 70 80 90 100 120 140 160 x10KHz
AM
FM
TUNING
POWER
INDICATOR LEVEL
10dB -20dB
SPEAKERS
ALL OFF FRONT
A
B
TAPE MONITOR
2CH 4CH
DOLBY NR ADAPTOR
LOUDNESS
FM MUTING
OFF
CD-4 SEPARATION
LEFT
MIN MAX
VOLUME
CD-4 SEPARATION
RIGHT
PHONES
FRONT REAR
FRONT
MIN MAX
BASS
MIN MAX
TREBLE
REAR
MIN MAX
BASS
MIN MAX
TREBLE
2CH
CD-4 — 4CH
RM
SQ FULL LOGIC
MODE
FM AUTO
MONO
AM
PHONO
AUX
FUNCTION
PIONEER 4 CHANNEL RECEIVER MODEL QX-747A

VOLUME CONTROL

Control for adjusting sound volume. When rotated clockwise, 4-channel speaker sound increases.

CD-4 SEPARATION (LEFT & RIGHT) CONTROLS

Controls for adjusting front and rear separation when playing CD-4 records using a CD-4 cartridge.

Please refer to page 16, section on CD-4 channel separation adjustment, for detailed information. After adjustment 2-channel records and matrix 4-channel records can also be played at the same setting.

LEFT Control: FRONT-LEFT (CH 1) and REAR-LEFT (CH 2) separation adjustment.
RIGHT Control: FRONT-RIGHT (CH 3) and REAR-RIGHT (CH 4) separation adjustment.

Be sure to readjust when replacing cartridge or stylus.

NOTE:
These SEPARATION CONTROLS are effective only when playing CD-4 records. When playing other records, set the MODE switch according to the record type and then adjust level balance by the BALANCE CONTROLS.

PHONES JACKS (FRONT & REAR)

Stereo headphone jacks

Front left and right (CH 1 & CH 3) can be heard when using FRONT jack.

Rear left and right (CH 2 & CH 4) can be heard when using REAR jack.

4-CHANNEL LEVEL INDICATOR

All channels simultaneously displayed; relative intensity easily compared and adjusted.

INDICATOR LEVEL BUTTONS

Step attenuator switches for convenient reading of the 4 Channel Level Indicator. If both buttons are depressed, their values are added, hence attenuations of 0dB, –10dB, –20dB and –30dB can be selected:

SPEAKERS BUTTONS

ALL OFF: Depress to turn off all speakers. Convenient when using headphones.
FRONT A,B: Two sets of front speakers are installed, this button selects desired set.

BASS & TREBLE CONTROLS

Separate controls are provided for front and rear bass and treble.

FM MUTING BUTTON

Circuit for eliminating inter-station noise and weak interfering stations when tuning FM broadcast. Up position is ON; depress button (OFF) to receive a weak station.

LOUDNESS BUTTON

Depress when listening at low volume levels for proper sound balance relative to the sensitivity of the human.

DOLBY NR ADAPTOR BUTTON

Used when employing separately sold Dolby NR Adaptor. Set to ON (depressed) for listening to FM Dolby broadcasts, playing Dolby encoded tape, or monitoring Dolby recording via the adaptor.

TAPE MONITOR BUTTONS

2 CH: Depress for playback of 2-channel tape deck. Also depress to monitor recording.
4CH: Depress for playback of 4-channel tape deck. Also depress to monitor recording.

CD-4 INDICATOR LAMP

This lights to indicate that CD-4 record is being played (only when the MODE switch is set at 4CH CD-4).

MODE & FUNCTION INDICATORS

Separate illuminated indicators provide one-glance recognition of the QX-747A operating mode and function. Left to right: 2 CH, 4 CH, CD-4, RM, SQ, AM, FM, PHONO, AUX, STEREO (FM stereo indicator).

TUNING KNOB

Rotate to tune in AM or FM broadcasts.

AM/FM METER

When tuning FM stations, meter should indicate in the dark "FM" area. When tuning AM stations, tune for maximum meter deflection toward the right of the scale.

FUNCTION SWITCH

Switch for selecting program source for playing.

AM: When listening to AM broadcasts.
FM MONO: When listening to FM monophonic broadcasts.
FM AUTO: Select when listening to FM stereo broadcasts. During FM monophonic broadcasts, automatically receives monophonic signals. Stereo indicator lights during FM stereo broadcasts.
PHONO: When playing records.
AUX: When playing component connected to the AUX terminals.

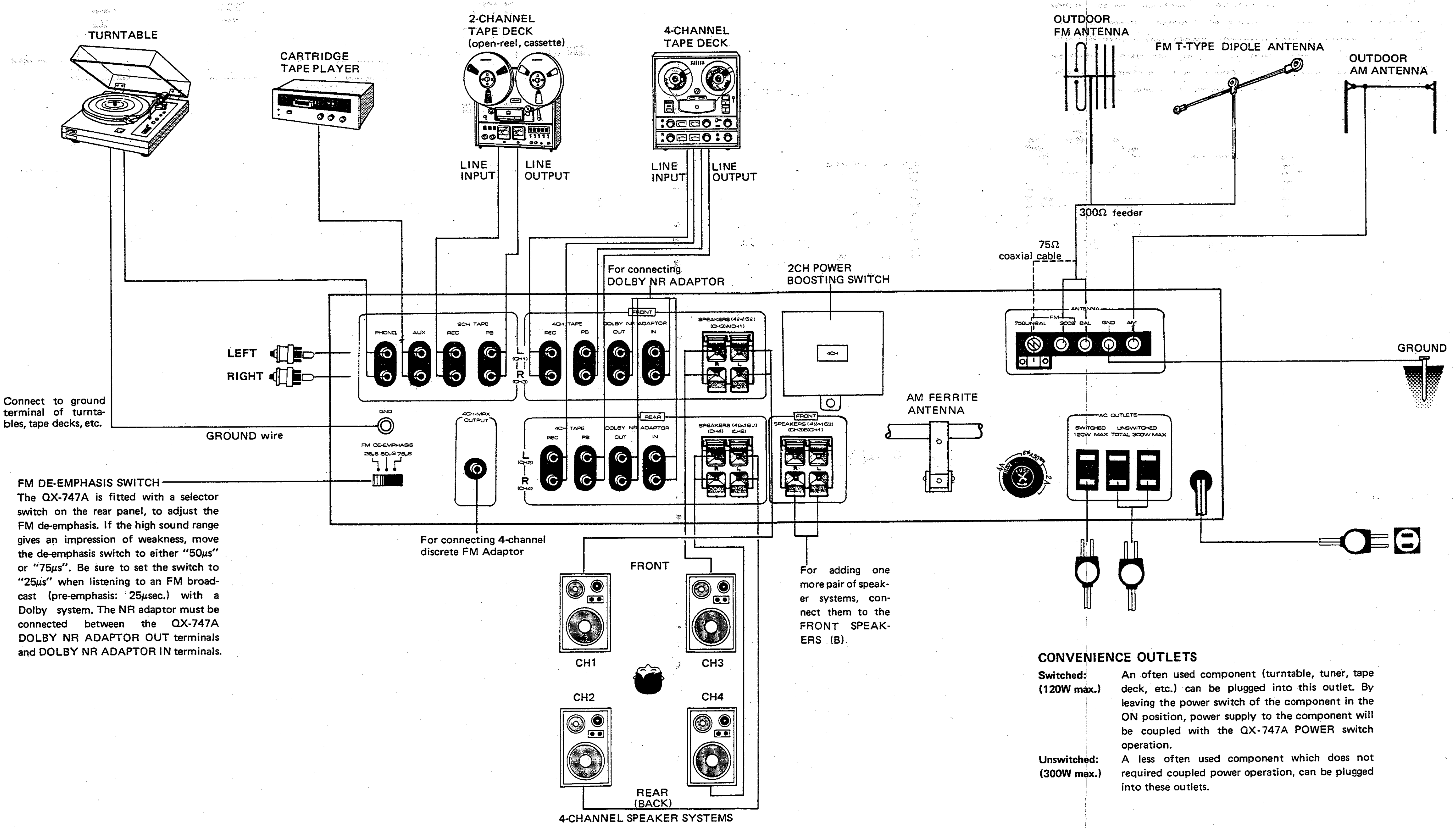
MODE SWITCH

Selector switch for 2-channel and each type of 4-channel reproduction method.

2CH: During 2-channel stereo reproduction. (Sound does not emerge from rear speakers.)
4CH: CD-4; For reproduction of discrete 4-channel tape, cartridge tape, or CD-4 records. 2-channel source can also be played in this position. At this time the same sounds are obtained from the rear left and right speakers as from the front left and right speakers (CH2 – CH1; CH4 – CH3).
RM; During 4-channel reproduction of Regular Matrix (RM) records and FM broadcasts. The matrix effect can also be obtained with a 2-channel program source.
SQ FULL LOGIC; For 4-channel reproduction of SQ system records and FM broadcasts. The matrix effect can also be obtained with a 2-channel program source.

NOTE:
Sound will not be obtained from the rear speakers (CH 2 & CH 4) at any setting of the Mode switch when the 2CH Power Boosting switch on the rear panel of the QX-747A has been set to 2CH.

3. CONNECTION DIAGRAM


TURNTABLE
CARTRIDGE TAPE PLAYER
2-CHANNEL TAPE DECK (open-reel, cassette)
LINE INPUT
LINE OUTPUT
4-CHANNEL TAPE DECK
LINE INPUT
LINE OUTPUT
OUTDOOR FM ANTENNA
FM T-TYPE DIPOLE ANTENNA
OUTDOOR AM ANTENNA
300Ω feeder
75Ω coaxial cable
For connecting DOLBY NR ADAPTOR
2CH POWER BOOSTING SWITCH
LEFT
RIGHT
PHONO
AUX
2CH TAPE
REC
PB
L (CH1)
R (CH3)
FRONT
4CH TAPE
REC
PB
DOLBY NR ADAPTOR
OUT
IN
SPEAKERS (4Ω~16Ω) (CH3)A(CH1)
4CH
ANTENNA
FM
75ΩUNBAL
300Ω BAL
GND
AM
GROUND
Connect to ground terminal of turntables, tape decks, etc.
GROUND wire
GND
FM DE-EMPHASIS
25μS 50μS 75μS
4CH-MPX OUTPUT
REAR
L (CH2)
R (CH4)
4CH TAPE
REC
PB
DOLBY NR ADAPTOR
OUT
IN
SPEAKERS (4Ω~16Ω) (CH4) (CH2)
FRONT
SPEAKERS (4Ω~16Ω) (CH3)B(CH1)
AM FERRITE ANTENNA
AC OUTLETS
SWITCHED 120W MAX
UNSWITCHED TOTAL 300W MAX
6ϕx30
4A
2A
FUSE
For connecting 4-channel discrete FM Adaptor
FRONT
CH1
CH3
CH2
CH4
REAR (BACK)
4-CHANNEL SPEAKER SYSTEMS
For adding one more pair of speaker systems, connect them to the FRONT SPEAKERS (B).

FM DE-EMPHASIS SWITCH

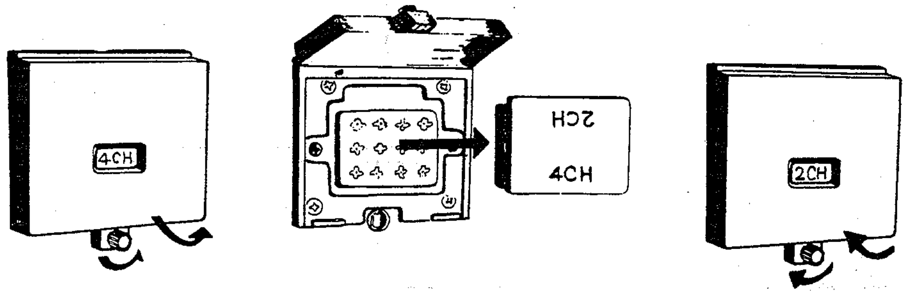
The QX-747A is fitted with a selector switch on the rear panel, to adjust the FM de-emphasis. If the high sound range gives an impression of weakness, move the de-emphasis switch to either "50μs" or "75μs". Be sure to set the switch to "25μs" when listening to an FM broadcast (pre-emphasis: 25μsec.) with a Dolby system. The NR adaptor must be connected between the QX-747A DOLBY NR ADAPTOR OUT terminals and DOLBY NR ADAPTOR IN terminals.

CONVENIENCE OUTLETS

Switched: (120W max.)	An often used component (turntable, tuner, tape deck, etc.) can be plugged into this outlet. By leaving the power switch of the component in the ON position, power supply to the component will be coupled with the QX-747A POWER switch operation.
Unswitched: (300W max.)	A less often used component which does not required coupled power operation, can be plugged into these outlets.

2CH Power Boosting Switch

To increase the available power when using the QX-747A for 2-channel reproduction, a convenient power select feature is incorporated. The covered compartment on the rear panel houses a reversible connector panel. When added power is desired during 2-channel operation, open the cover, remove the connector panel and rotate it 180°, then re-insert it and close the cover. Be sure to reverse the connector again before returning to 4-channel operation. When the cover is open, power is turned off.



Loosen screw to open cover

Pull out connector

Rotate connector 180° and re-insert it.

Fig. A

Line Voltage and Fuse

QX-747A Receivers are designed to accept different line voltages (110V, 120V, 130V, 220V, 240V) according to the country in which they are to be used. The line voltage selector located on the rear panel. Fig. B shows the power connection, auxiliary power outlets and voltage selector. Fig. C shows an exploded view of the line voltage selector.

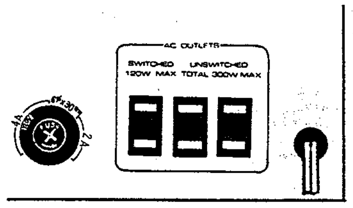


Fig. B

CHANGING LINE VOLTAGE SETTING AND FUSE

To remove the fuse, unscrew the fuse cap located in the center of the line voltage selector and withdraw it, together with the fuse. Next, pull the line voltage selector plug out of its socket, rotate it until the cutaway aligns with the appropriate line voltage marked on the back of the unit, then push it back into its socket. It is important to check the rating of the fuse; a 2A fuse should be used with either 220V or 240V, while a 4A fuse should be used for 110V, 120V, or 130V operation. If the fuse rating is not correct, replace it and screw in the fuse cap.

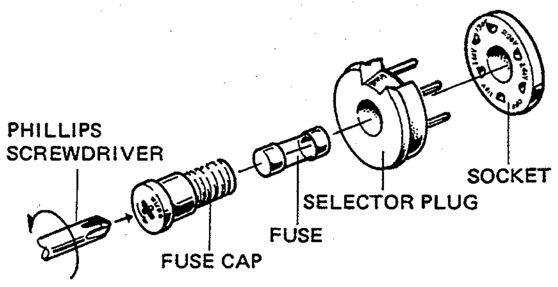
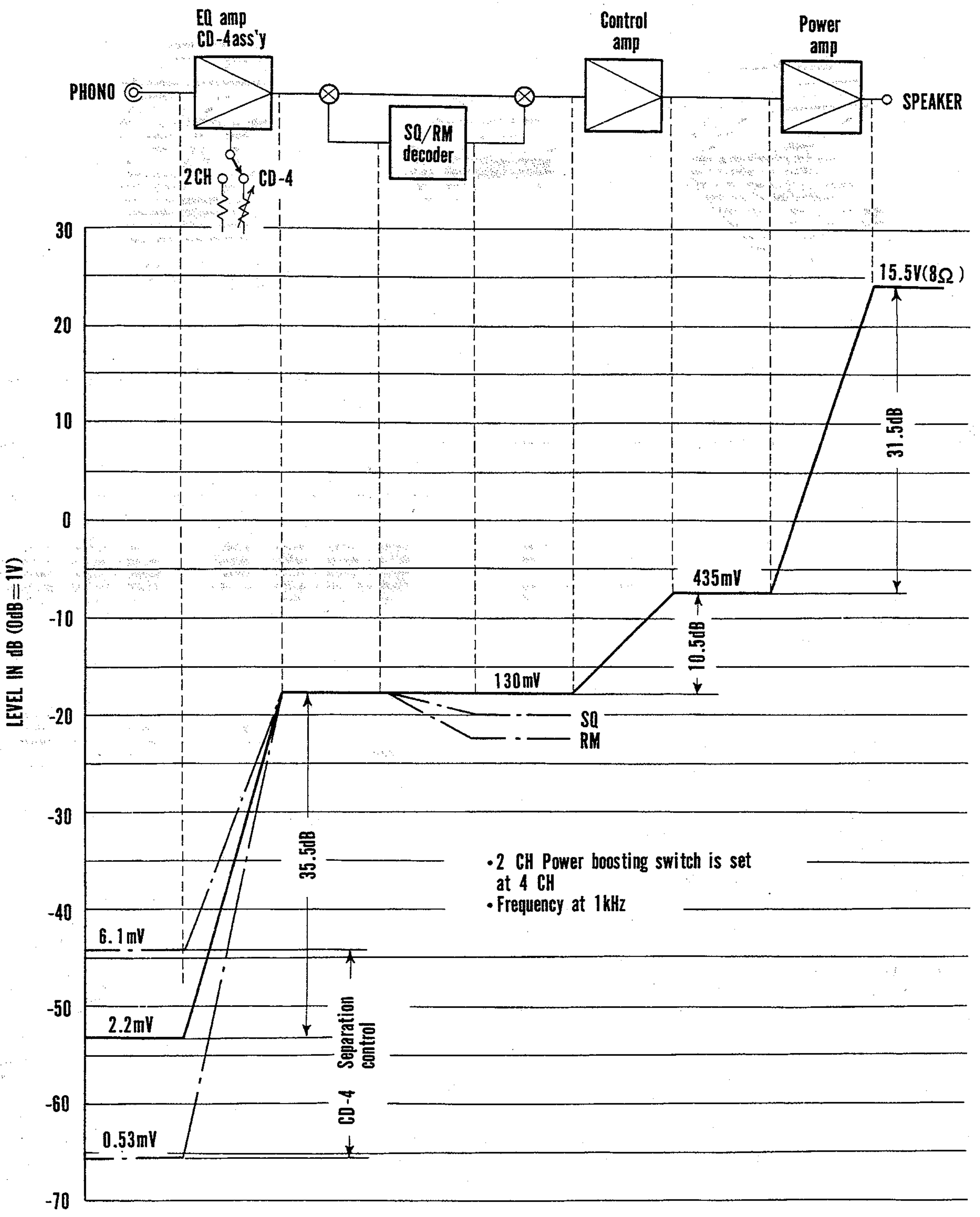
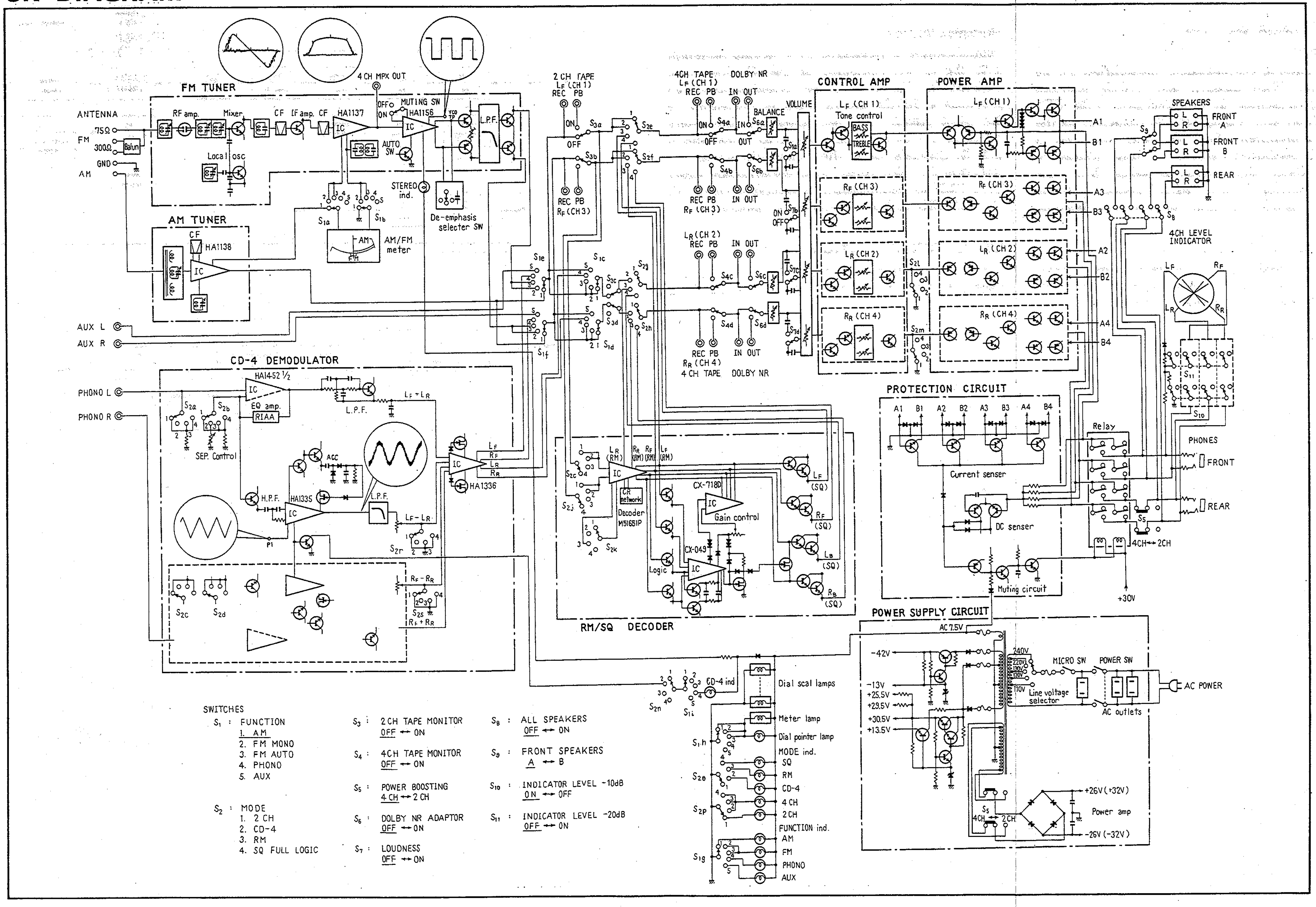


Fig. C

4. LEVEL DIAGRAM



5. BLOCK DIAGRAM


FM TUNER
ANTENNA
FM 75Ω
300Ω
GND
AM
Balun
RF amp.
Mixer
Local osc
CF
IF amp.
HA1137
4 CH MPX OUT
MUTING SW
OFF
ON
HA1156
AUTO SW
VCO
L.P.F.
STEREO ind.
De-emphasis selecter SW
AM TUNER
HA1138
AM/FM meter
AUX L
AUX R
CD-4 DEMODULATOR
PHONO L
PHONO R
HA1452 ½
EQ amp.
RIAA
SEP. Control
L.P.F.
LF + LR
ACC
H.P.F.
HA1335
LF − LR
HA1336
RF − RR
RF + RR
2 CH TAPE
LF (CH 1)
REC PB
RF (CH 3)
4CH TAPE
DOLBY NR
IN OUT
BALANCE
VOLUME
LR (CH 2)
RR (CH 4)
CONTROL AMP
Tone control
BASS
TREBLE
POWER AMP
LF (CH 1)
RF (CH 3)
LR (CH 2)
RR (CH 4)
A1
B1
A2
B2
A3
B3
A4
B4
SPEAKERS
FRONT A
FRONT B
REAR
4CH LEVEL INDICATOR
PROTECTION CIRCUIT
Relay
Current senser
DC senser
Muting circuit
PHONES
FRONT
REAR
4CH ↔ 2CH
+30V
RM/SQ DECODER
CR network
Decoder M51651P
CX-718D
Gain control
CX-049
Logic
LF (SQ)
RF (SQ)
LR (SQ)
RR (SQ)
POWER SUPPLY CIRCUIT
AC 7.5V
−42V
−13V
+25.5V
+29.5V
+30.5V
+13.5V
240V
220V
120V
110V
Line voltage selector
MICRO SW
POWER SW
AC POWER
AC outlets
+26V (+32V)
Power amp
−26V (−32V)
4CH ↔ 2CH
CD-4 ind
Dial scal lamps
Meter lamp
Dial pointer lamp
MODE ind.
SQ
RM
CD-4
4 CH
2 CH
FUNCTION ind.
AM
FM
PHONO
AUX

SWITCHES

S_1 : FUNCTION
1. AM
2. FM MONO
3. FM AUTO
4. PHONO
5. AUX

S_2 : MODE
1. 2 CH
2. CD-4
3. RM
4. SQ FULL LOGIC

S_3 : 2 CH TAPE MONITOR
OFF ↔ ON

S_4 : 4CH TAPE MONITOR
OFF ↔ ON

S_5 : POWER BOOSTING
4 CH ↔ 2 CH

S_6 : DOLBY NR ADAPTOR
OFF ↔ ON

S_7 : LOUDNESS
OFF ↔ ON

S_8 : ALL SPEAKERS
OFF ↔ ON

S_9 : FRONT SPEAKERS
A ↔ B

S_{10} : INDICATOR LEVEL −10dB
ON ↔ OFF

S_{11} : INDICATOR LEVEL −20dB
OFF ↔ ON

6. CIRCUIT DESCRIPTION

6.1 FM TUNER SECTION

Front End

The outstanding performance, exemplified by the remarkable 80dB imaging and 100dB spurious rejection, originates in the dual-gate MOS FET RF amplifier and 4-gang variable capacitor tuning circuit. A modified Clapp circuit is employed in the local oscillator, leading to high frequency stability. Since the output is taken from the oscillator tuning circuit, higher harmonics in the oscillator signal and spurious response become reduced.

IF Amplifier and Detector

Comprise 2 dual element ceramic filters, 1 transistor, and 1 IC (integrated circuit). The IC (HA1137) circuit is illustrated in Fig. 2.

Multiplex Decoder

Demodulation is performed by switching detection with the circuit contained in the IC (HA1156), depicted in Fig. 3. A phase locked loop (PLL) produces a 38kHz square wave synchronized to the pilot signal. The two gates are alternately switched ON-OFF by this signal to derive the L and R channels from the composite signal. By detecting the pilot signal level, the switching signal from PLL to demodulator is operated ON-OFF. The STEREO indicator lights at the same time.

6.2 AM TUNER SECTION

Composed of single IC (HA1138) combining a 1 stage RF amplifier and a 2 stage IF amplifier (Fig. 4).

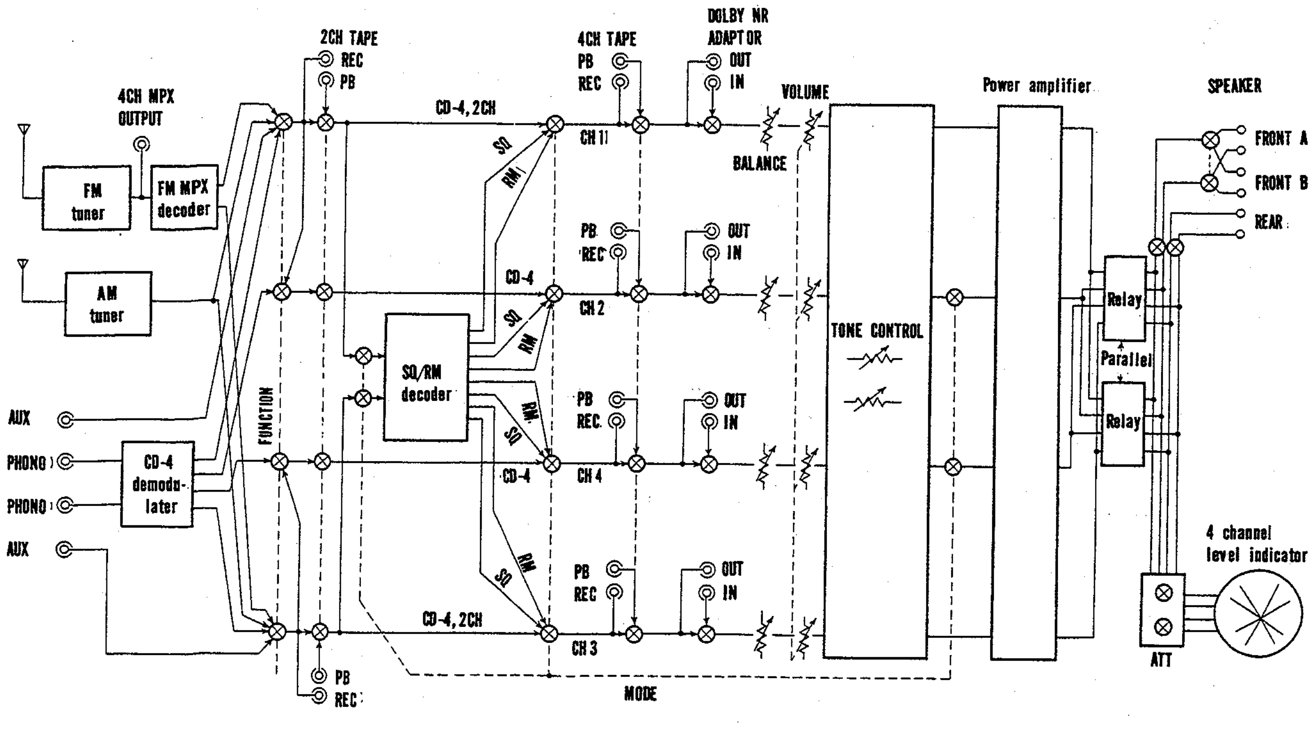

4CH MPX OUTPUT
FM tuner
FM MPX decoder
AM tuner
AUX
PHONO 1
PHONO 2
AUX
CD-4 demodulater
FUNCTION
2CH TAPE
REC
PB
CD-4, 2CH
SQ
RM
CD-4
SQ/RM decoder
4CH TAPE
PB
REC
DOLBY NR ADAPTOR
OUT
IN
VOLUME
BALANCE
CH 1
CH 2
CH 4
CH 3
TONE CONTROL
Power amplifier
SPEAKER
FRONT A
FRONT B
REAR
Relay
Parallel
Relay
4 channel level indicator
ATT
MODE
PB
REC

Fig. 1

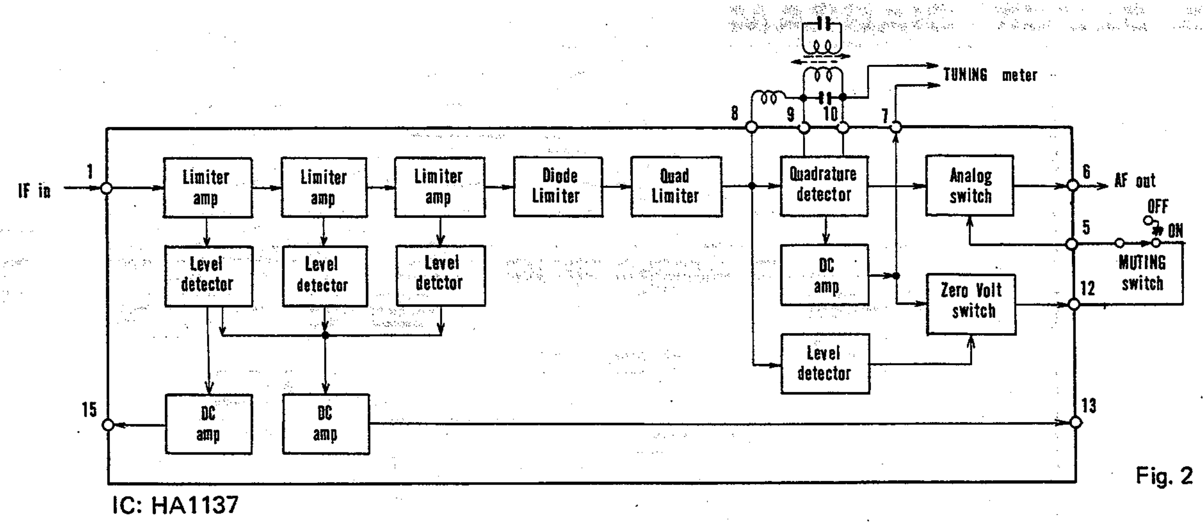

TUNING meter
8
9
10
7
IF in
1
Limiter amp
Limiter amp
Limiter amp
Diode Limiter
Quad Limiter
Quadrature detector
Analog switch
6
AF out
OFF
5
ON
MUTING switch
Level detector
Level detector
Level detctor
DC amp
Zero Volt switch
12
Level detector
15
DC amp
DC amp
13
IC: HA1137

Fig. 2

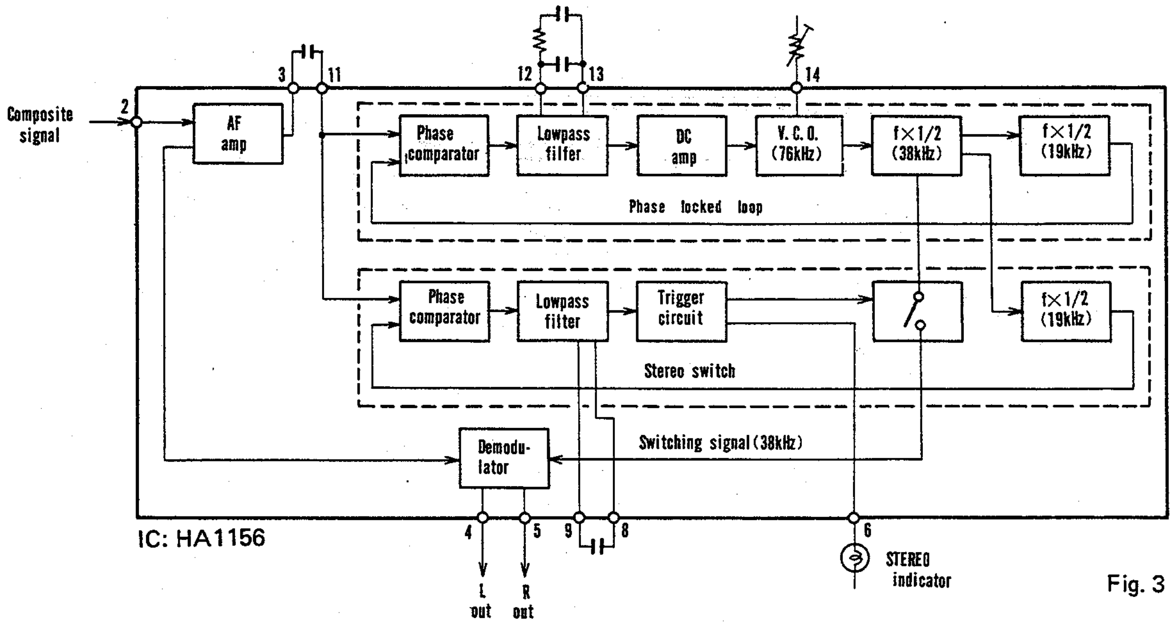

Composite signal
2
3
11
12
13
14
AF amp
Phase comparator
Lowpass filter
DC amp
V.C.O. (76kHz)
f×1/2 (38kHz)
f×1/2 (19kHz)
Phase locked loop
Phase comparator
Lowpass filter
Trigger circuit
f×1/2 (19kHz)
Stereo switch
Demodulator
Switching signal (38kHz)
IC: HA1156
4
5
9
8
6
L out
R out
STEREO indicator

Fig. 3

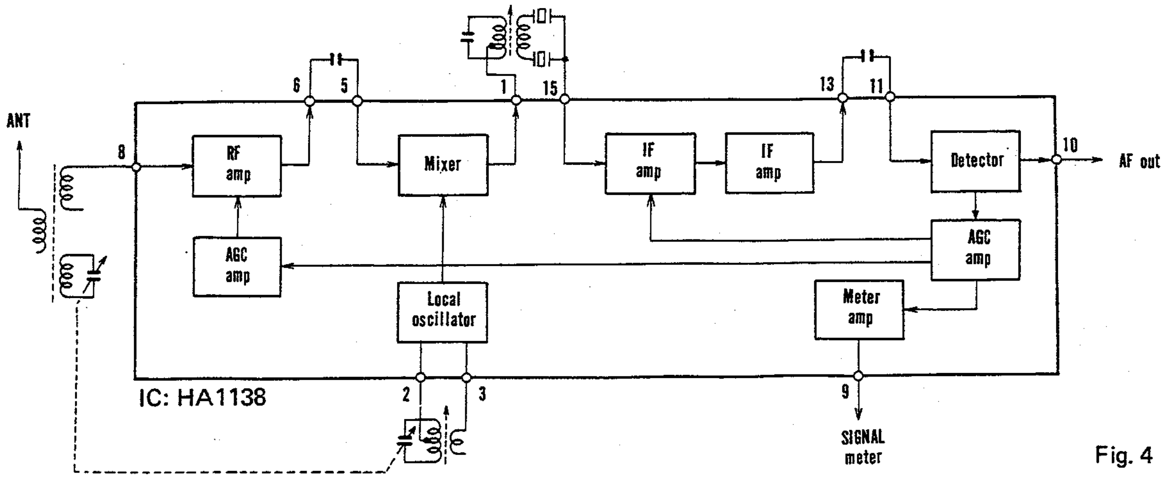

ANT
8
6
5
1
15
13
11
RF amp
Mixer
IF amp
IF amp
Detector
10
AF out
AGC amp
AGC amp
Local oscillator
Meter amp
IC: HA1138
2
3
9
SIGNAL meter

Fig. 4

6.3 CD-4 DEMODULATOR SECTION

Fig. 5 illustrates the composition of this section.

Sum Signal System

IC HA1452 is an orthodox 2-channel equalizer amplifier. In CD-4 operation, a variable resistor is inserted in the NFB circuit to provide separation control by varying the main signal (sum signal) gain. Although the final objective of the CD-4 demodulator is to matrix the sum and difference signals, as the difference signal is demodulated from a frequency modulated 30kHz carrier (sub signal), and the sum signal varies according to the cartridge output level (though indirectly related), level matching becomes necessary.

In other than the CD-4 mode, a fixed resistor replaces of the variable resistor to provide a fixed gain (35.6dB at 1kHz) equalizer amplifier. The inclusion of a balanced power supply with this circuit maintains input and output point potentials at 0V, preventing click noises when switches are operated. The 100kΩ impedance of this circuit is changed to 50kΩ by inserting two 100kΩ resistors

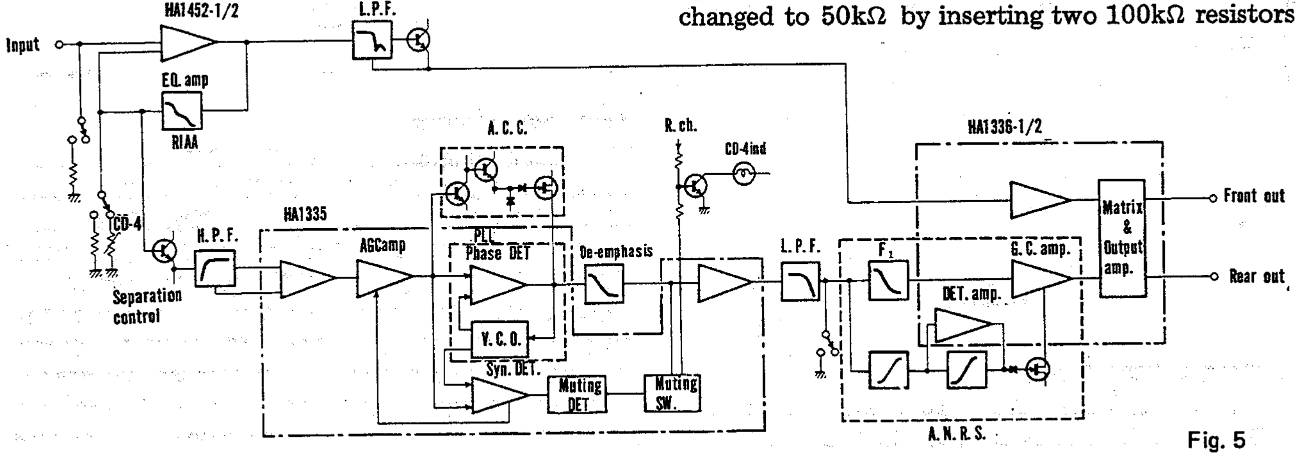

HA1452-1/2
L.P.F.
Input
EQ. amp
RIAA
CD-4
H. P. F.
Separation control
HA1335
AGCamp
A. C. C.
PLL
Phase DET
V. C. O.
Syn. DET.
Muting DET
Muting SW.
De-emphasis
R. ch.
CD-4ind
L. P. F.
F₁
HA1336-1/2
G. C. amp.
DET. amp.
Matrix & Output amp.
Front out
Rear out
A. N. R. S.

Fig. 5

RECORDING AND PLAYBACK OF CD-4 DISCS

The CD-4 disc is a recent development. Being a "Discrete" 4-channel medium, it features excellent channel separation when played over suitable 4-channel equipment, but can also be played as a conventional 2-channel stereo record.

Fig. 6 shows the configuration of signals present in a CD-4 record.

Each of the two sub-signals occupies a frequency modulated supersonic carrier with a center frequency of 30kHz.

The sub-signal conveys the "Front—Rear" difference information.

The main signals are recorded as a conventional stereo record, occupying the 30Hz ~ 15kHz audio band and conveying the "Front+Rear" sum information.

From these sum and difference signals, the original 4 channel signals are retrieved in a series of algebraic operations performed in the demodulator:

$$(Lf + Lr) + (Lf - Lr) = 2Lf$$
$$(Lf + Lr) - (Lf - Lr) = 2Lr$$
$$(Rf + Rr) + (Rf - Rr) = 2Rf$$
$$(Rf + Rr) - (Rf - Rr) = 2Rr$$

where "R" stands for Right, "L" for Left, "f" for front, "r" for rear.

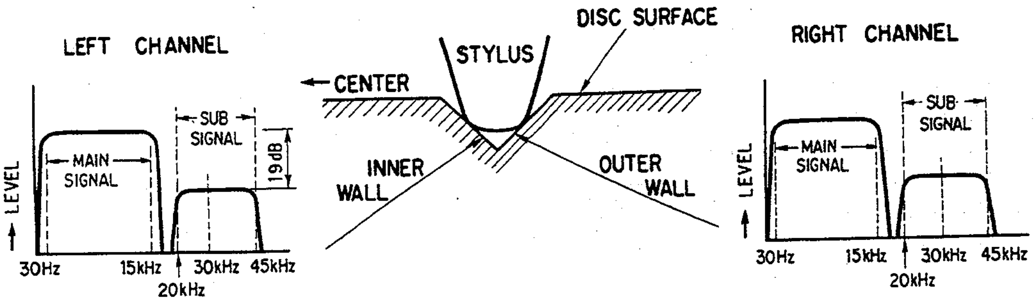

LEFT CHANNEL
← LEVEL
MAIN SIGNAL
SUB SIGNAL
19dB
30Hz
15kHz
30kHz
45kHz
20kHz
DISC SURFACE
STYLUS
← CENTER
INNER WALL
OUTER WALL
RIGHT CHANNEL
← LEVEL
MAIN SIGNAL
SUB SIGNAL
30Hz
15kHz
30kHz
45kHz
20kHz

Fig. 6

in parallel during other than CD-4 operation.

The equalizer amplifier output goes through a low pass filter (LPF) to remove the sub signal (30kHz FM signal). This LPF is an active filter of which the frequency response is shown in Fig. 7.

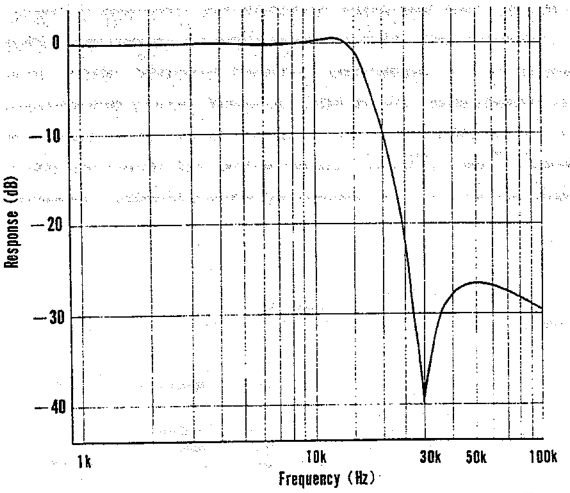


Fig. 7

Difference Signal System

The sub signal is taken from the equalizer amplifier NFB circuit. As it does not pass through the RIAA playback standard equalizer, it possesses a flat frequency response. After passing through a high pass filter (fc = 27kHz, 12dB/oct.), the sub signal enters IC HA1335.

This IC contains a phase locked loop (PLL) FM demodulator circuit, an automatic gain control (AGC) circuit to stabilize the PLL input signal, a muting circuit to cut the demodulated output in the absence of an input signal, and a demodulated signal amplifier. In addition to the IC, a de-emphasis circuit, automatic capture range control (ACC) circuit, LPF, HPF, indicator lamp drive, and other circuits are used to demodulate the difference signal from the sub signal.

*AGC Amplifier

Fig. 8 shows the AGC amplifier principle. In this circuit, e_1 is the input signal voltage, e_2 the output signal voltage, Vr the reference voltage, and Vb the control voltage.

If Vb is much greater than Vr, I_3 becomes approximately equal to I_2 and $e_2 \cong 0$. Conversely, if Vb is much less than Vr, I_3 becomes approximately equal to I_1 and e_2 reaches a maximum (determined by the maximum gain of the AGC amplifier). The amplifier gain can therefore be controlled by Vb in this manner, Vb being obtained from a synchronous detector.

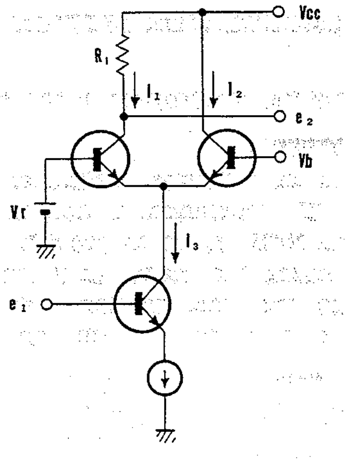


Fig. 8

*FM Demodulator

The block diagram of the PLL FM demodulator circuit is depicted in Fig. 9. This circuit consists of a voltage control oscillator (VCO), phase comparator (PC), DC amplifier (A) and low pass filter (LPF), with a type of NFB loop following the input signal. The VCO oscillates at a controlled frequency according to the LPF output voltage. A voltage proportional to the phase difference between the input signal and VCO oscillation output is generated in the PC. By using this voltage to control the VCO oscillation, the oscillation becomes locked to the input signal phase.

If the input signal is frequency modulated, the control signal obtained from the LPF becomes the FM demodulated output. With an excessively large frequency deviation of the input signal, which the PLL circuit cannot follow, the lock becomes disengaged. The frequency range in which locking can be performed is termed the lock range.

Locking also becomes impossible when the VCO free running frequency (oscillating frequency without an input signal) and input signal frequency are excessively separated. The frequency range in which locking can be performed is termed the capture range. The locking and capture ranges are determined by the PLL loop gain and LPF constant.

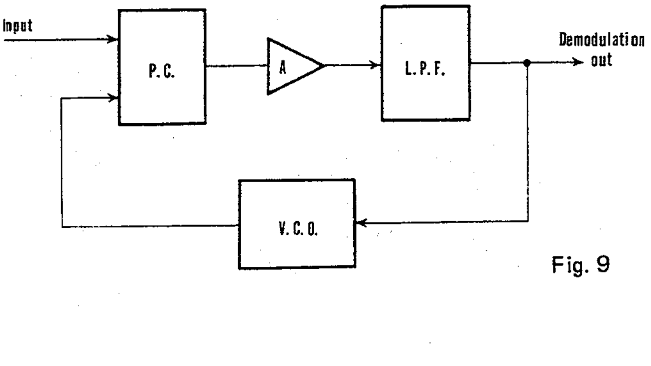


Fig. 9

***Synchronous Detector**

The PLL produces a in phase signal with the input signal. By employing this to switch the input signal, full-wave rectification and a DC voltage proportional to the input signal oscillation are obtained. The same in-phase frequencies are required at this time. The frequencies become the same if the PLL is locked, they then become in-phase by shifting the VCO output phase by 90°.
A DC voltage rise proportional to the input level is obtained as AGC from this circuit, together with muting in the form of a DC voltage drop inversely proportional to the input level.

***Muting Circuit**

The muting circuit is shown in Fig.10. Q1 and Q2 form a Schmidt trigger. Q5 is inserted between the signal line of the difference signal demodulator circuit and ground. The collector of Q4 is connected to the CD-4 indicator circuit and its potential is employed to determine whether or not the CD-4 demodulator circuit operates. The synchronous detector provides the input to this circuit.
DC voltage is supplied to the muting circuit from the synchronous detector when the sub signal is absent. Q1 then switches ON, Q2 OFF, and Q3, Q4 & Q5 ON. The difference signal demodulator circuit line is thus shorted to ground and Q4 collector potential reduces.
When a CD-4 record is played and the sub signal is applied to the synchronous detector, the input DC voltage of the muting circuit declines in inverse proportion to the sub signal level. If the sub signal is above a certain level, the Q1 & Q2 Schmidt trigger circuit reverses: Q1 switches OFF, Q2 ON, and Q3, Q4 and Q5 OFF. This removes the short to ground of the difference signal demodulator circuit output line and Q4 collector voltage increases.

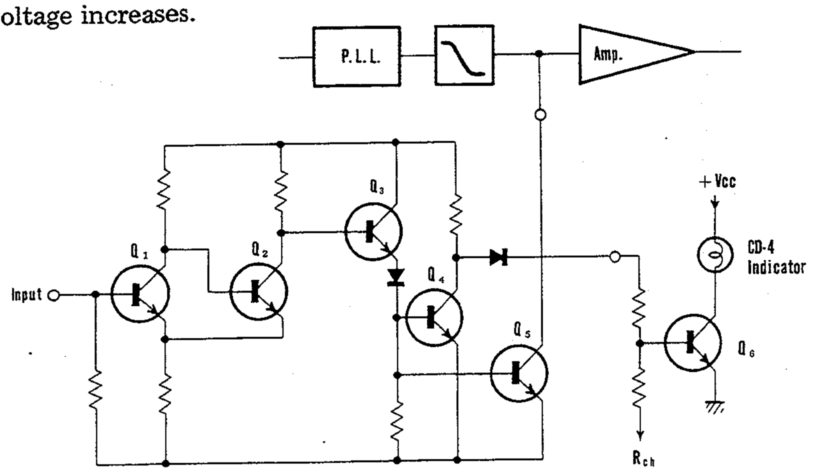


Fig. 10

***CD-4 Indicator Circuit**

Q6 in Fig. 10 is the lamp drive transistor. With a high Q4 collector voltage (during CD-4 play), Q6 is switched ON and the CD-4 indicator lamp lights. This lighting operation is synchronized to the previously described muting circuit operation (in practice, it is slightly delayed). The lamp lights if either the right or left channel gate is open, and extinguishes when both gates are closed.

***ACC (Automatic Capture Range Control)**

The PLL does not lock frequencies out of the capture range and cannot follow frequency variations exceeding the lock range. Automatic control of the PLL capture range is provided by the ACC. It also functions to suppress noise and prevent misoperation with sources other than CD-4.
Peak values associated with amplitude variations in the PLL input sub signal, transients with which AGC is ineffective, noise, main signal interference with the sub signal (sub signal modulated by the main signal) and other causes are converted into a DC voltage. By using this voltage to regulate the equivalent internal resistance of the FET in the PLL load circuit, the PLL capture range (lock range) can be automatically controlled.
There is no PLL detector output with respect to sub signal AM components. However, if the sub signal is AM modulated by noise or the main signal, this can also be considered as phase modulation. This effect is minimized since amplification of the sub signal AM component narrows the PLL lock range (playback bandwidth becomes narrow).
AGC amplifier gain is maximum with no input signal. If some sort of input becomes available at this time, a large output can be temporarily obtained (until the AGC takes effect). For this reason, the PLL capture range is narrowed by the ACC and remains completely unlocked with an input other than the sub signal. The PLL locks with as sub signal input and when the AGC takes effect, the PLL lock range becomes widened by the ACC.

***ANRS (Automatic Noise Reduction System)**

The ANRS is employed in the difference signal system for CD-4 records in order to improve SN ratio and reduce crosstalk distortion from the cartridge. It is not used in the sum signal system in order to preserve compatibility with 2-channel stereo records.

The ANRS consists of a mutually reciprocal compressor and expander (Fig. 11).

In CD-4 application, compression and expansion are performed in the area of 700Hz and above 2kHz. Fig. 12 shows the ANRS composition used in this set.

Although expansion is normally performed separately for middle and high frequencies, it is not divided in this set (in practice, this poses no difficulty). Filter F1 possesses ANRS expansion properties when compensation is maximum. F2 is a middle and high frequency bandpass filter (bands at which ANRS is employed). The output of this section is amplified and rectified, then used to control the equivalent internal resistance of the FET.

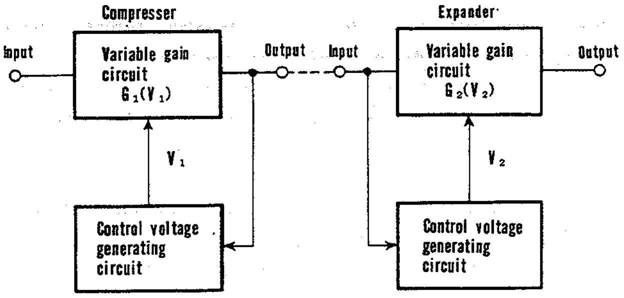


Fig. 11

This FET regulates the NFB in the gain control amplifier (GCA). Its equivalent internal resistance declines with a middle and high frequency input to the circuit, decreasing NFB to the GCA and increasing GCA gain. As these frequencies increase further, the resistance continues to decline and eventually saturates. At this point, the F1 frequency response is cancelled by GCA frequency response, resulting in a flat response in the ANRS expander circuit. In this manner, the GCA compensates F1 frequency response according to the input level.

Consequently, the ANRS frequency response becomes flat above a certain level and when middle and high frequency levels decline, it approaches the frequency response of F1. Below a certain level, the response of F1 is attained. Applying ANRS reduces noise level by an average of 8dB. Also, if 15dB separation is available in the cartridge, crosstalk distortion becomes negligible.

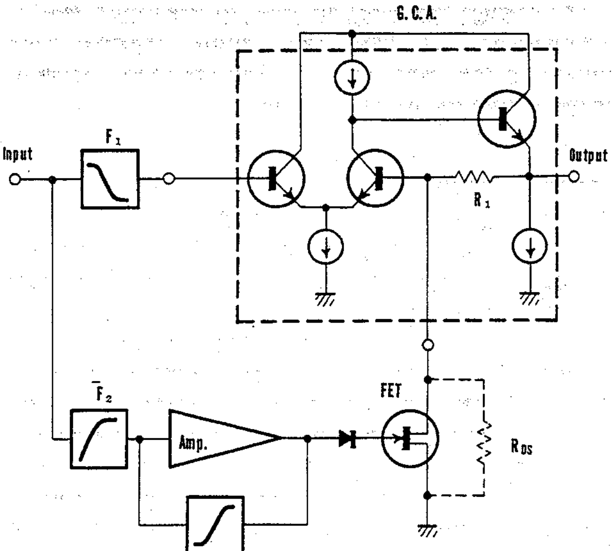


Fig. 12

***Matrix Section**

Matrixing (adding or subtracting) the front and rear sum signals of the main signal system, and the front and rear difference signals of the sub signal system, the front and rear signals are derived.

$$M = F + R$$

$$S = F - R$$

$$M + S = (F + R) + (F - R) = 2F$$

$$M - S = (F + R) - (F - R) = 2R$$

6.4 SQ FULL LOGIC/RM DECODER SECTION

SQ System

The Matrix four channel system utilizes 2-channel media (tape, records, broadcasts, etc.) to transmit 4 or more channel signals. Four channel playback systems employ matrixing 4-2-4 (n-2-4) to convert 2-channel into 4-channel. The main systems currently available for this purpose are RM (Regular Matrix) and SQ (Stereo Quad).

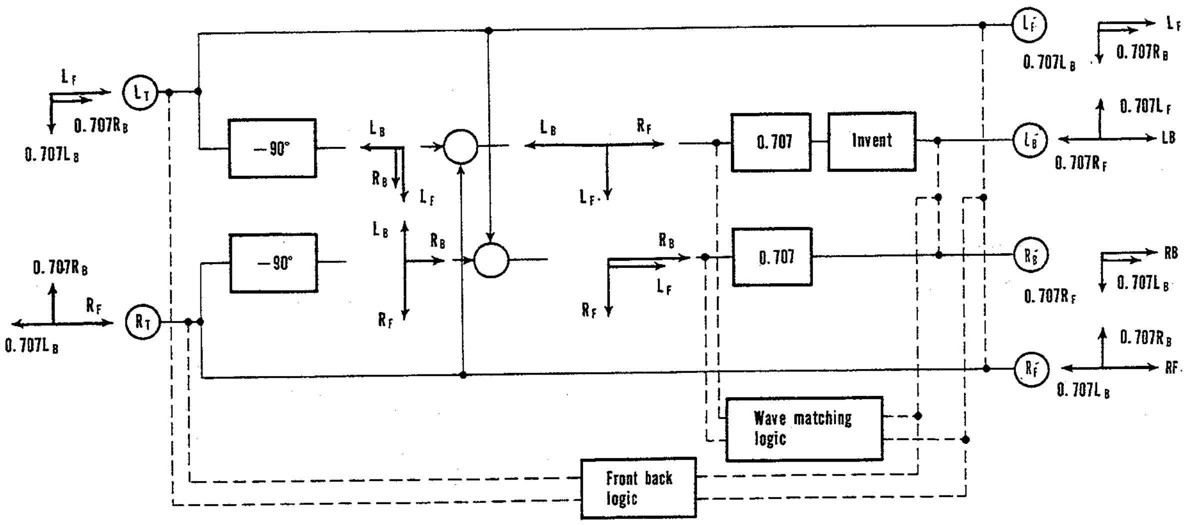
With the RM system, if the only sound source is LF (left front), −3dB crosstalk occurs in the RF (right front) and LB (left back). In the SQ system however, −3dB occurs in LB and RB (right back). RM and SQ are therefore not compatible.

Fig. 13 shows the basic SQ decoder construction and signal vectors. LT and RT are combined in LB and RB, while LF' and RF' are taken directly from LT and RT. LB' and RB' are obtained from LT and RT by phase shifting and blending. But LB' and RB' contain respective LF, RF other than necessary components. Left and right separation remains good since LF' does not combine with RF, and RF' does not combine with LF.

If the sound source is CF (center front) or CB (center back), front to rear separation cannot be obtained since LF', RF', LB' and RB' all become the same volume. The logic circuit is provided to improve this effect.

With CF crosstalk to LB and RB is at out of and since with CB crosstalk to LF and RF is also at out of, only these anti-phase components are cancelled. This is termed front-back logic. The objective of full logic is to deal not only with CF and CB sound sources, but also with various other directions.

Front-back logic performs CF and CB detection, while wave matching logic performs LF, RF, LB and RB detection. The combined detector signal passes through a time constant circuit and is applied to the gain control circuit, where gain is controlled in order to adequately reduce the crosstalk level.



LF
LT
0.707RB
0.707LB
0.707RB
RF
RT
0.707LB
−90°
−90°
LB
RB
LF
LB
RB
RF
LB
RF
LF
RB
LF
RF
0.707
Invent
0.707
Wave matching logic
Front back logic
LF'
LF
0.707LB
0.707RB
0.707LF
LB'
LB
0.707RF
RB'
RB
0.707RF
0.707LB
0.707RB
RF'
RF
0.707LB

Fig. 13

Circuit Composition

Three ICs are employed, as shown in Fig. 15. M51651P is an SQ basic decoder and can function as an SQ decoder without independent logic. Although a phase shift network is not included, by a CR network, this IC performs to shift the phase 90° with cover wide range. A selector switch also permits the IC to be used as an RM decoder. During RM, a blend resistor is added at the front, while the rear is blended internally by the IC and taken from separate terminals.

CX-049 is a high density full logic IC incorporating both wave matching and front back logic. CX-718D is a gain control IC and contains four MOS FETs to form a variable resistance voltage control circuit. Since these MOS FETs are P channel enhancement types, equivalent internal resistance becomes infinite when gate voltage is zero. By applying a negative voltage to the gate (Fig. 14), the equivalent internal resistance can be varied from infinity to several hundred ohms.

2SK40V (FET) is employed for back blending. With a CF sound source, it functions to cancel the mutually opposite crosstalk phase to LB and RB. This is an N channel depletion type junction FET and when the gate voltage is zero, the channel is already established. LB and RB become normally blended for this reason, and the gate becomes open only in the case of a single signal from LB or RB.

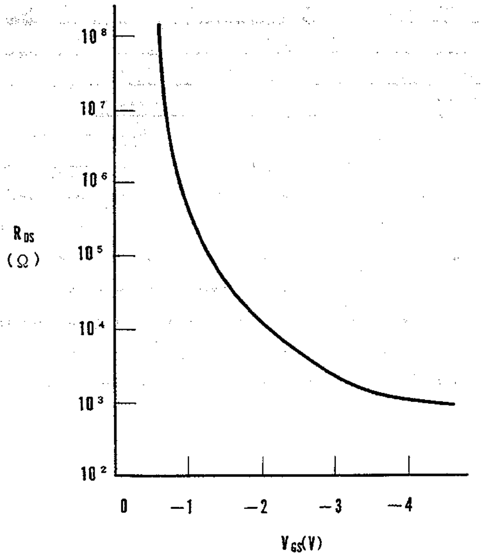
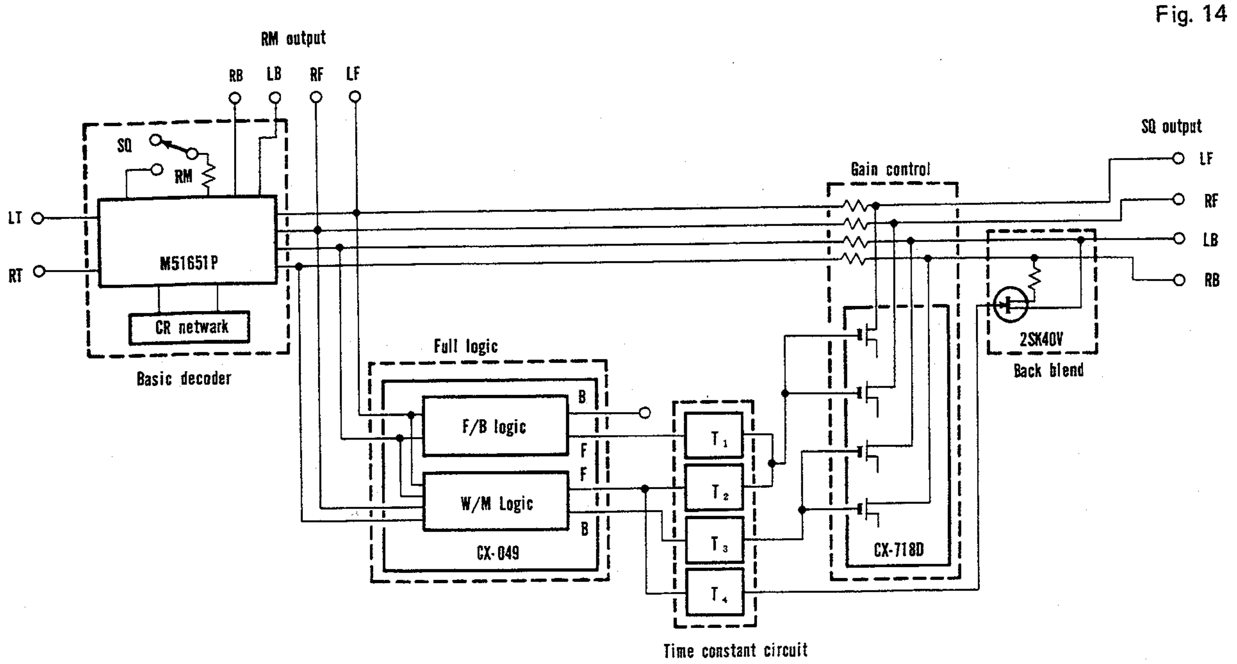


Fig. 14



RM output
RB
LB
RF
LF
SQ
RM
LT
RT
M51651P
CR netwark
Basic decoder
Full logic
F/B logic
W/M Logic
CX-049
B
F
F
B
T₁
T₂
T₃
T₄
Time constant circuit
Gain control
CX-718D
SQ output
LF
RF
LB
RB
2SK40V
Back blend

Fig. 15

Operating Description

The input signal (LT & RT) enters the SQ basic decoder (M51651P), where 4-channel signals LF, RF, LB and RB are obtained by the SQ decode matrix, then these signals enter the gain control, back blend and logic circuits. The front-back logic produces a positive voltage with a CF sound source, and a negative one with a CB source. This voltage passes through the time constant circuit and is applied to the gates of the MOS FETs for LF and RF gain control.

As these FETs are P channel enhancement types, their equivalent internal resistance decreases only when a negative voltage is applied. Front (LF & RF) output signal levels are attenuated with a CB sound source.

For rear control, wave matching logic produces a negative voltage with respect to a front single signal (LF or RF) and a positive voltage with respect to a rear single signal (LB or RB). Front control is also performed by producing the reverse polarity of these voltages.

The rear control voltage passes through the time constant circuit and is applied to the gates of MOS FETs for LB and RB gain control. The front control voltage passes through the time constant circuit and is applied to the gates of the junction FET for back blend and the MOS FETs for LF and LB gain control. As the junction FET is an N channel depletion type, LB and RB are normally blended, but the device becomes open when a negative voltage is applied.

The detector outputs of the full logic IC (CX-049) with respect to sound source are shown in the following table.

		LF	RF	LB	RB	CF	CB	Gain control*
F/B logic	F	0	0	0	0	+	–	LF, RF
	B	0	0	0	0	–	+	**
W/M logic	F	+	+	–	–	0	0	LF, RF***
	B	–	–	+	+	0	0	LB, RB

**Gain control operates (attenuates) with (–) detecting mode.*

***Front back logic output B is not employed.*

****Back blend is not performed only when wave matching logic output F mode is (–).*

CAUTION

The gain control IC (CX-718D) is an MOS (metal oxide semiconductor) type and subject to dielectric breakdown from static electricity. Note the following precaution when handling.

**Do not remove the aluminum cap from the IC until it has been installed in the circuit. First solder the IC to the circuit board, then remove the aluminum cap.*

6.5 CONTROL AMPLIFIER CIRCUIT

The control amplifier circuit of the QX-747A is the NFB type.

Low Frequency Control

The low frequency control circuit is shown in Fig. 16, and the equivalent circuit, when boosting low frequency, is shown in Fig. 17.

As the parallel impedance of VR1 and C11, in Fig. 17, is high at low frequency, the volume of the NFB decreases and the gain in the low frequency range increases.

The equivalent circuit, when cutting out low frequencies, is shown in Fig. 18. In this case, the input signal is applied to Q5, through the parallel impedance of VR1 and C9, which is high in the low frequency range and suppresses the lower frequency signals.

High Frequency Control

The high frequency control circuit is shown in Fig. 19, and the equivalent circuit, when boosting high frequencies, is shown in Fig. 20.

In this circuit, the input signal is applied to Q5 through the parallel impedance circuit. This impedance is small in the high frequency range and produces a signal with an enhanced high range. Fig. 21 shows the equivalent circuit when cutting out high frequencies. As the impedance of R19, R21 and C13 of the circuit becomes small, the level of the NFB increases and the gain of the circuit decreases.

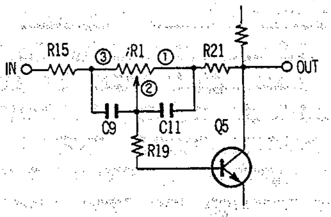

IN
R15
③
VR1
①
②
R21
OUT
C9
C11
R19
Q5

Fig. 16

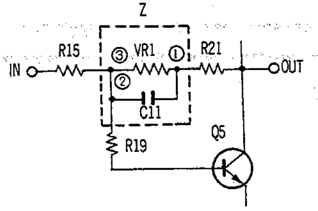

Z
IN
R15
③ VR1 ①
②
R21
OUT
C11
R19
Q5

Fig. 17

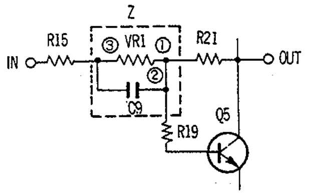

Z
IN
R15
③ VR1 ①
②
R21
OUT
C9
R19
Q5

Fig. 18

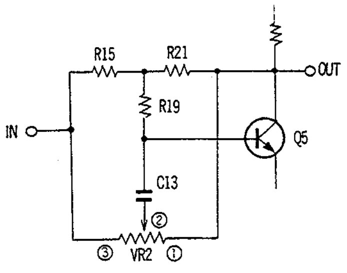

R15
R21
OUT
IN
R19
Q5
C13
②
③ VR2 ①

Fig. 19

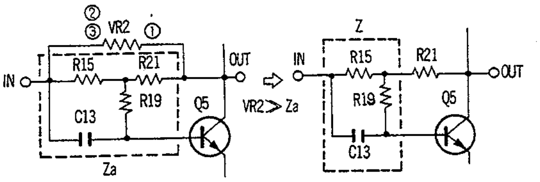

②
③ VR2 ①
IN
R15
R21
R19
C13
Q5
OUT
Za
VR2 > Za
Z
IN
R15
R21
R19
C13
Q5
OUT

Fig. 20

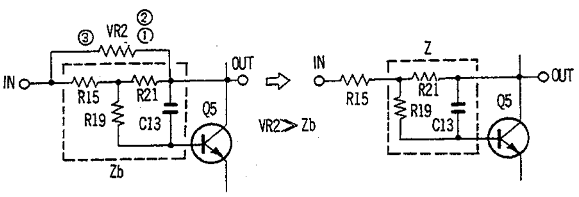

②
③ VR2 ①
IN
R15
R21
R19
C13
Q5
OUT
Zb
VR2 > Zb
IN
R15
Z
R21
R19
C13
Q5
OUT

Fig. 21

6.6 POWER AMPLIFIER SECTION

This unit possesses four power amplifiers. The circuitry employs a balanced power supply and consists of direct-coupled Darlington connection pure complementary OCL amplifiers. By applying 100% DC NFB from the output stage center point to the first stage differential amplifier, circuit DC gain becomes 0dB. Since the center point potential is determined by the first stage base potential, temperature compensating and fine adjustment circuits are included in the first stage base bias circuit to maintain the center point potential at 0V.

2-channel Power Boosting Circuit

The power supply can be boosted when using this unit as a 2-channel stereo amplifier (using only ch1 and ch3, and with the MODE switch set to 2CH). Power transistors of channels 1 and 3 are of higher rating than those of channels 2 and 4. Their supply voltage can be raised during 2-channel operation to provide increased power to each channel.

Power boosting is available by turning over the rear panel plug. This raises the power transformer secondary winding taps and opens CH2 and CH4 power amplifier output circuits.

For safety reasons, a microswitch in the power transformer primary side cuts off the power supply when the selector plug cover is opened.

6.7 PROTECTION CIRCUIT

This protection circuit functions to protect the speakers from damage due to short-circuit of the load, etc., and performs a muting operation to cut noise and distortion which occur when switching the power on and off.

The circuit is shown in Fig. 22, and consists of a bridge type over-current and overload detector, a differential amplifier DC voltage detector, and a power switch on/off detector section.

Relay Driving Circuit

Q7 – Q9, in Fig. 22, comprise the relay driving circuit.

In the normal condition reverse bias is applied to the base of Q7, and Q7 is in a cutout condition. When one of the above mentioned detection circuits goes on, current flows through R28, the base potential falls and Q7 is turned on. Consequently Q8 comes on and Q9 goes off. When Q9 goes off, the current of the relay circuit is cut, to release the switch of the output circuit.

When the power switch is turned on, a delay operation occurs in this circuit. R33, R34 and C7, in the base circuit of Q9, are the time constant elements which determine the delay time. When the power switch is switched on, C7 charges to a potential of +30 volts through R33 and R34, and Q9 is kept in the OFF condition during this time. When the power source is switched off the muting operation of Q8 prevents shock noise. In the normal condition, the potentials of +30 volts and −5.1 volts are applied to Q8 through R31 and R32. The resultant potential at the base of Q8 is −1 volt in the cutout condition. When the power supply is turned off, the potential of −5.1 volts disappears immediately, due to the small time constant of the power circuit. Thus a positive base potential remains, switching Q8 on, which in turn switches off Q9 and hence the relay.

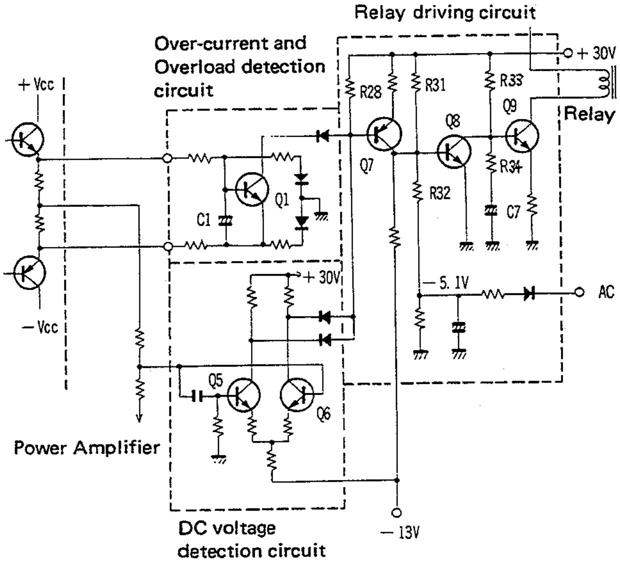


Fig. 22

Over-current and Overload Detection

The equivalent circuit of this detector section is shown in Fig. 23, and Fig. 24 shows the equivalent circuit at the time of a positive half cycle. When this equivalent circuit is overloaded, the balance of the bridge, formed by RE1, R1, R9 and RL, is disturbed, and a potential is produced between b and a in such a direction that Q1 is turned on. When Q1 is turned on, the collector current increases, the relay driving circuit functions and the relay switch of the output circuit is turned off. After the cause of the overload is removed, the bias of Q1 is reduced and the relay switch turns on to automatically restore normal operation, Fig. 25 shows the equivalent circuit at the time of a negative half cycle. In this circuit a potential is produced between b and e as above, and Q1 is turned on.

Detection of DC Voltage

This is a differential amplifier consisting of Q5 and Q6, as shown in Fig. 26. The bases of Q5 and Q6 are connected to the junction-points of the power amplifiers. When the DC balance of the power stage is lost for some reason, a potential difference is produced in the input signal to the differential amplifier, and the collector currents of Q5 and Q6 are put out of balance. Thus, the relay driving circuit functions, and the relay switch is turned off.

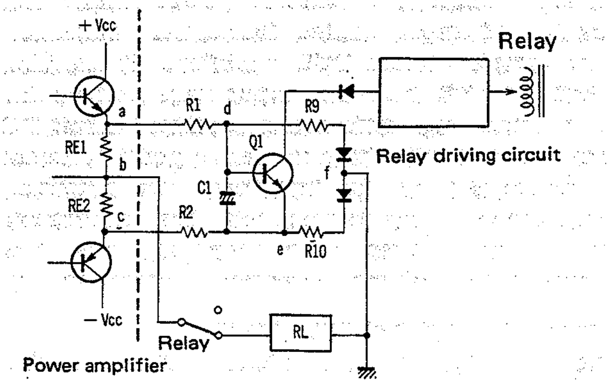

+Vcc
a
RE1
b
RE2
c
−Vcc
R1
d
R9
Q1
C1
f
R2
e
R10
Relay
Relay driving circuit
RL
Relay
Power amplifier

Fig. 23

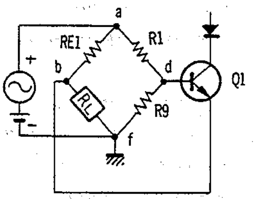

a
RE1
R1
+
b
d
Q1
RL
R9
−
f

Fig. 24

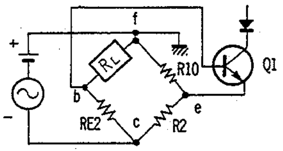

f
+
RL
R10
Q1
b
−
RE2
c
R2
e

Fig. 25

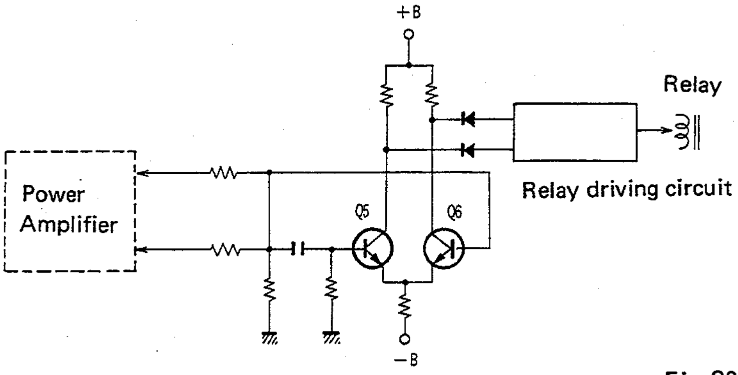
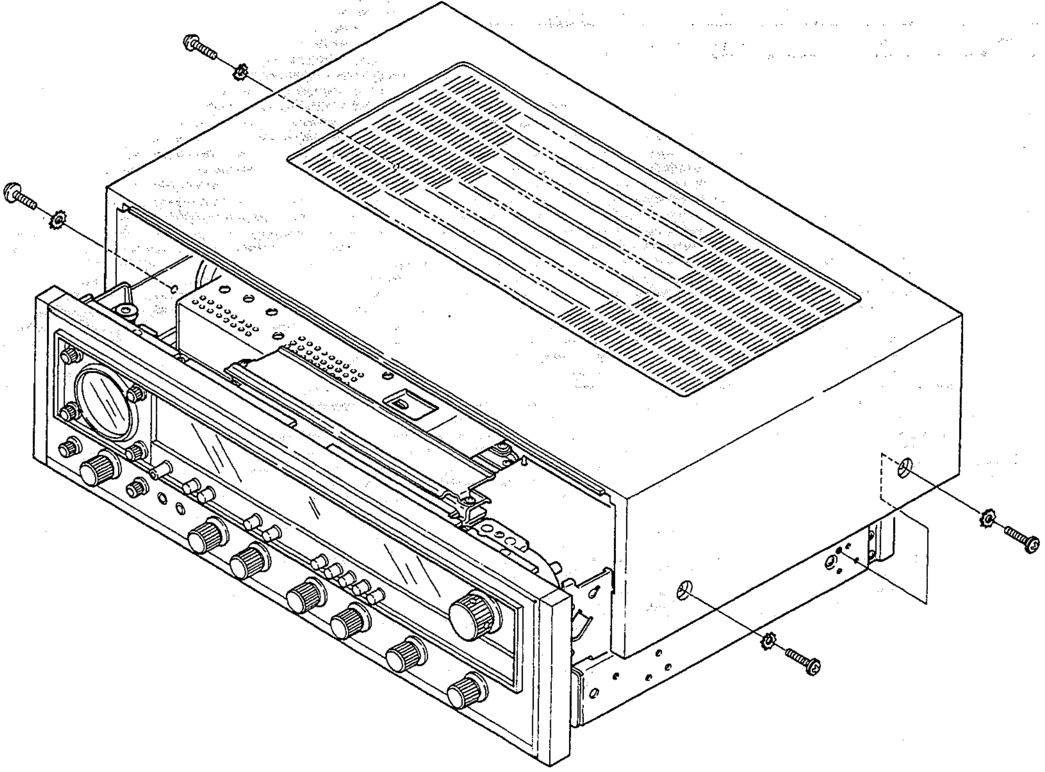

+B
Relay
Relay driving circuit
Power Amplifier
Q5
Q6
−B

Fig. 26

7. DISASSEMBLY

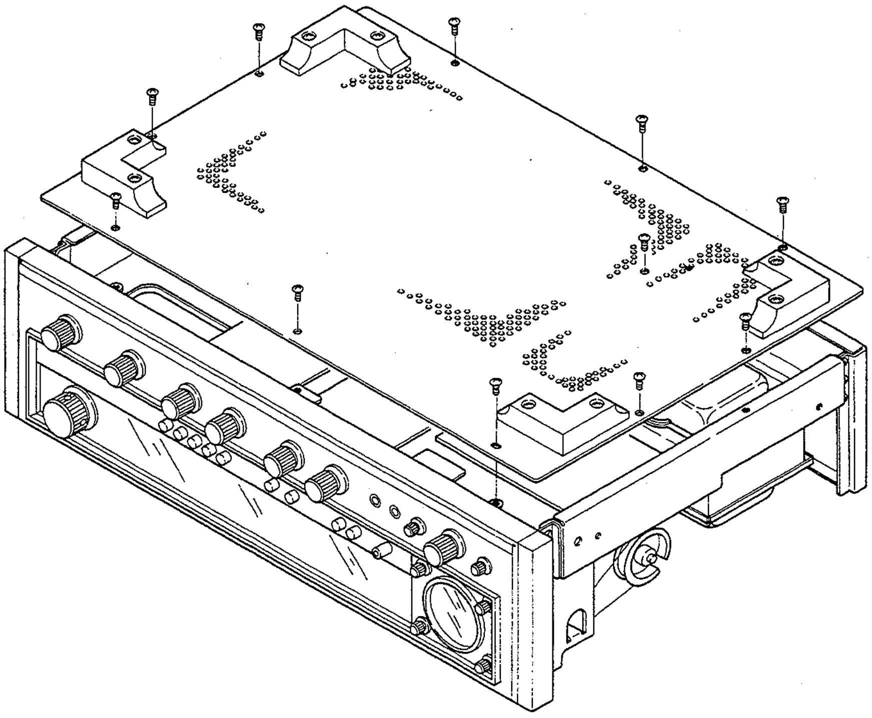
Wooden Cabinet

Unscrew the two screws holding each side, then lift the back of the wooden cabinet.



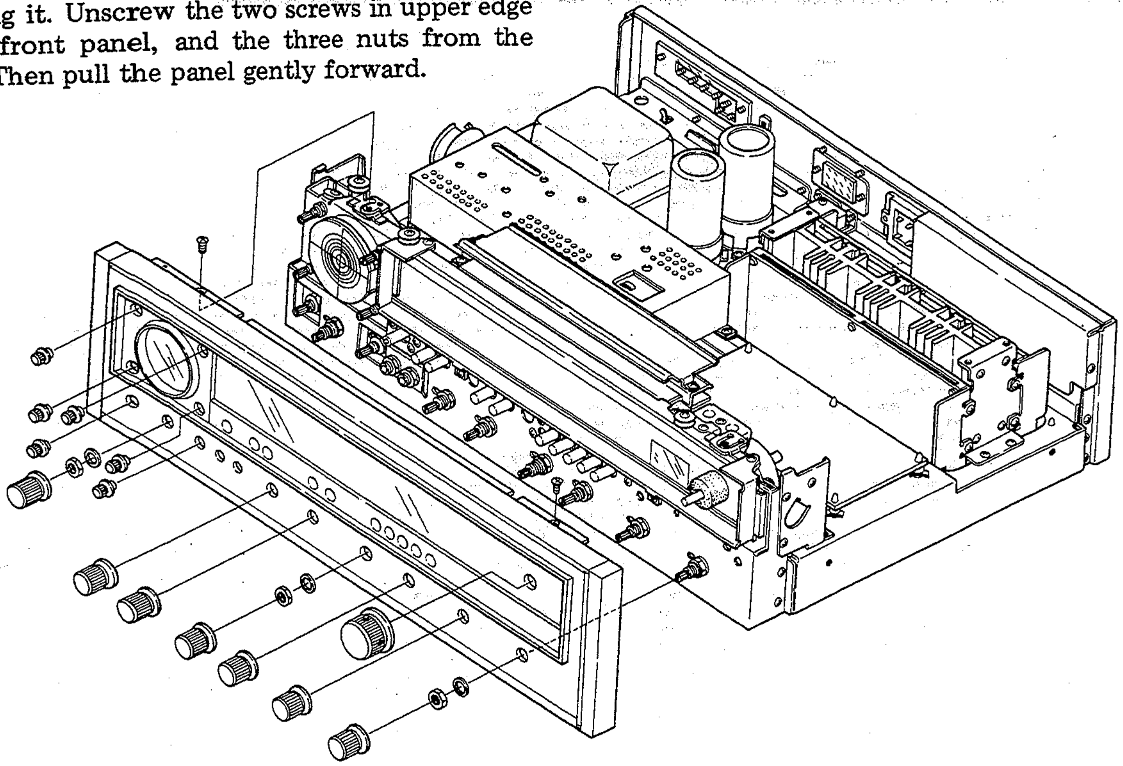
Bottom plate

Unscrew a total of the 11 screws holding it in place.



Front Panel

Pull off all the knobs. For TUNING knob, loosen the set screws with a hexagonal wrench before removing it. Unscrew the two screws in upper edge of the front panel, and the three nuts from the shafts. Then pull the panel gently forward.



8. ADJUSTMENTS

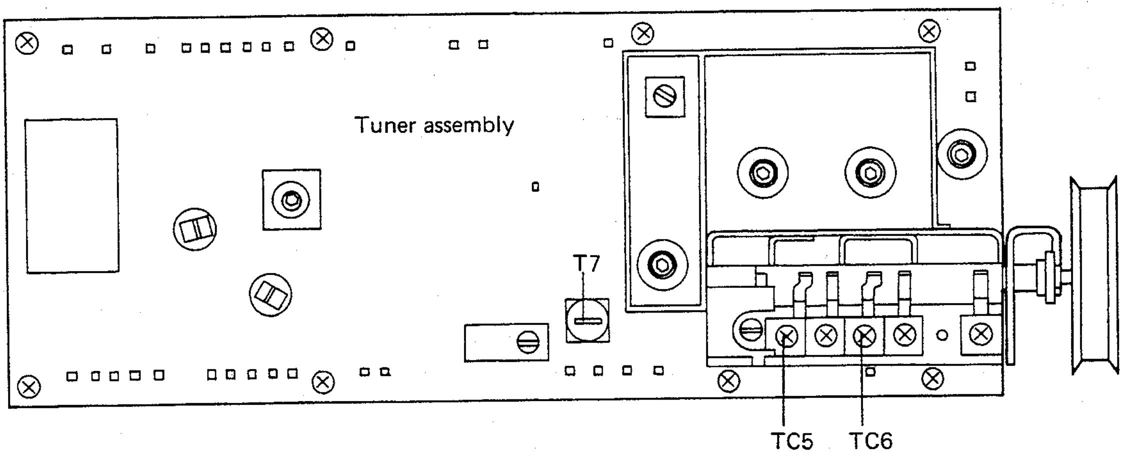
*Do not attempt to adjust the CD-4 assembly or RM/SQ assembly. These adjustments require special test equipment, including a CD-4 signal generator, SQ encoder and other apparatus.

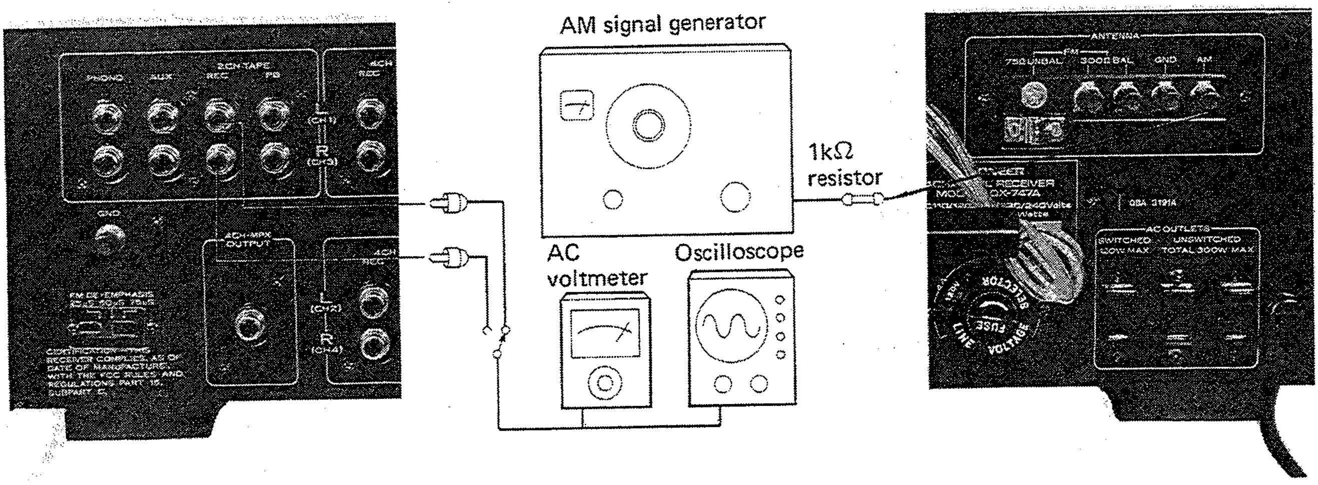
Required Measuring Instruments

- FM signal generator
- MPX signal generator
- AM signal generator
- Millivolt meter
- Distortion meter

AM Section

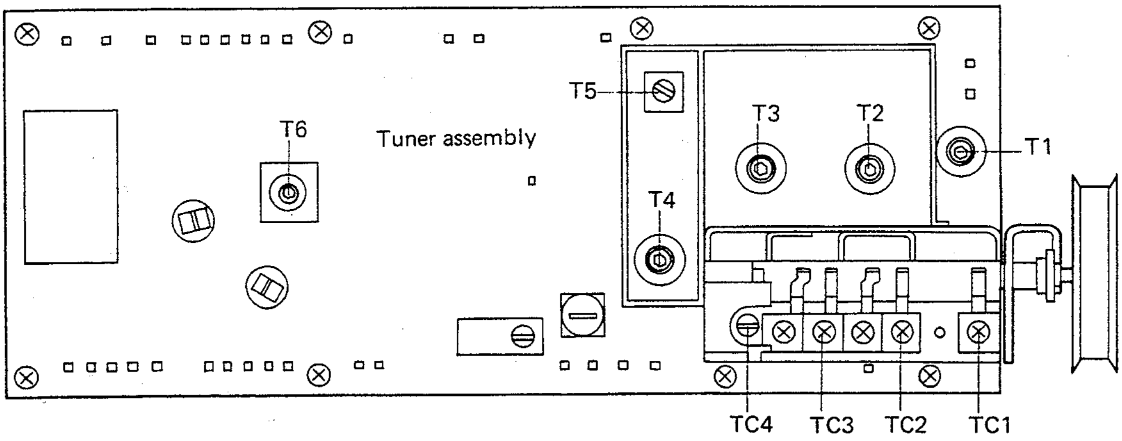
1. Set the AM signal generator at 400Hz 30% modulation. Connect the generator output to the AM antenna terminal through a 1kΩ resistor.
2. Connect the oscilloscope and voltmeter in parallel to TAPE REC jack.
3. Set the signal generator output level at approximately 30dB. Set signal generator and set dials to 600kHz.
4. Adjust cores of T7 (tuner assembly) and the bar antenna for peak output.
5. Set signal generator and set dials to 1,400kHz.
6. Adjust TC5 and TC6 (tuner assembly) for peak output.
7. Repeat steps (3) through (6) several times to obtain optimum tracking.

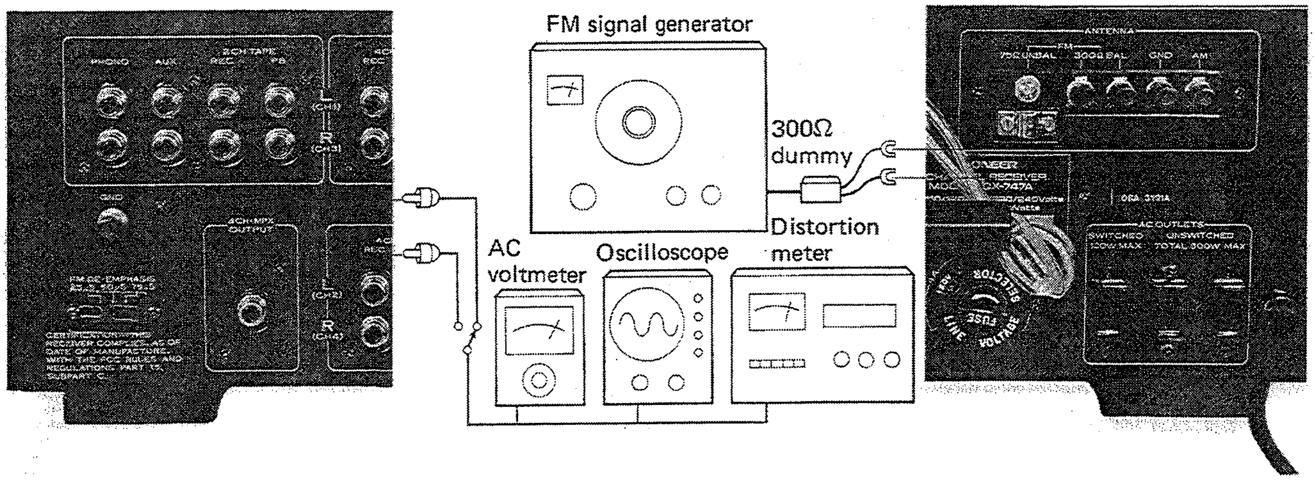




FM Section

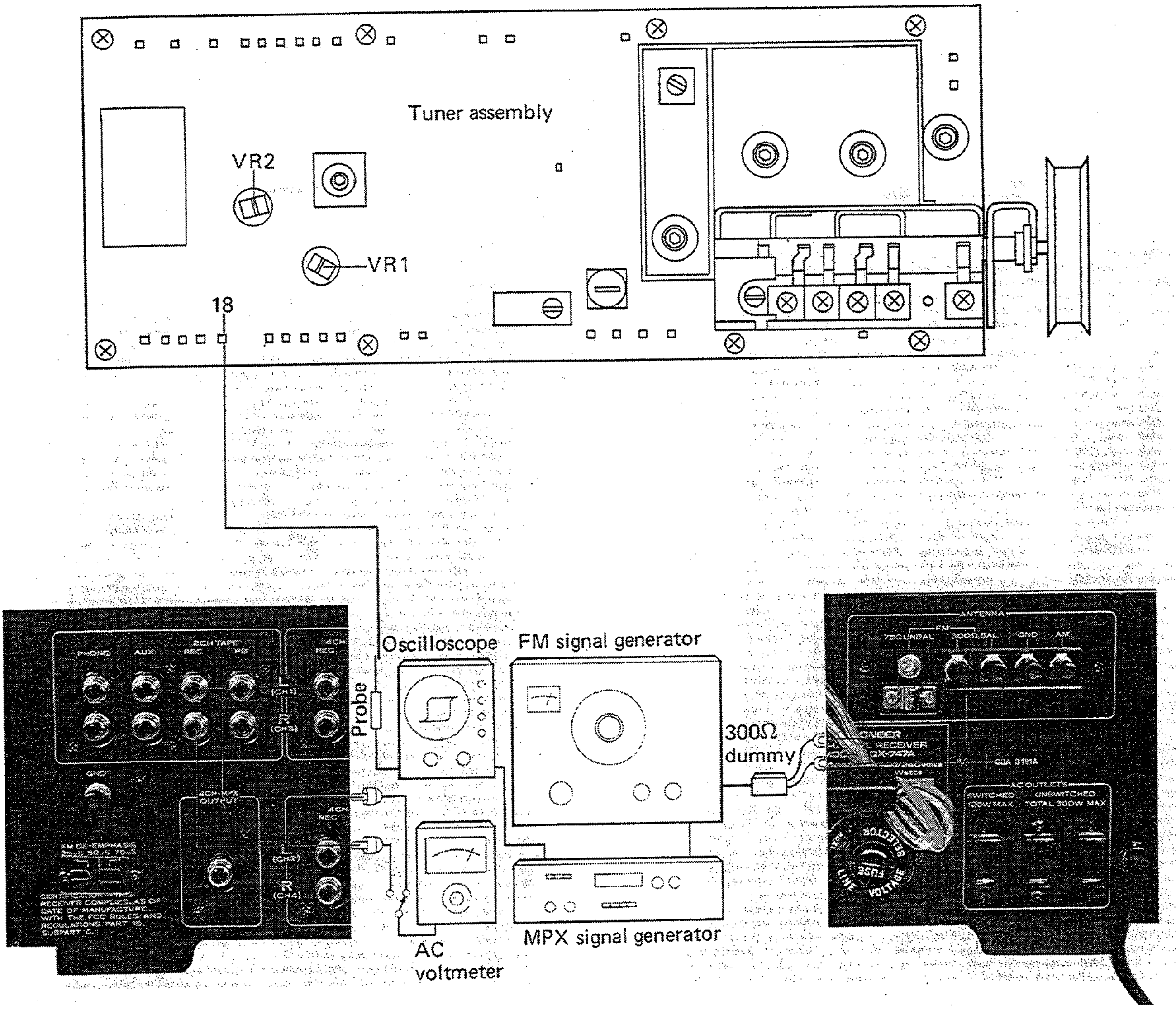
1. Set the FM signal generator at 400Hz 100% modulation.
   Connect generator output to the FM antenna terminals through a 300Ω balanced dummy antenna.
2. Connect the oscilloscope, voltmeter, and distortion meter in parallel across TAPE REC jack.
3. Set the signal generator output level to 8~10dB.
   Set the signal generator and set dials to 90MHz.
4. Adjust cores of T4 (tuner assembly) and T1, T2, and T3 to obtain peak output.
5. Set signal generator and set dials to 106MHz.
6. Adjust TC4 (tuner assembly) and TC1, TC2, and TC3 to obtain peak output.
7. Repeat steps (3) through (6) several times, to obtain optimum tracking.
8. Set the frequency to 90MHz and adjust the T5 core of the tuner assembly to obtain peak output.
9. Detune the set so that noise only is received. Adjust the primary (bottom) core of T6 so that the tuning meter pointer indicates the center position.
10. Set signal generator and set dials to 98MHz. Set signal generator output level to 60dB. Carefully tune the set to this frequency as indicated by the tuning meter.
11. Adjust the secondary (top) core of T6 (tuner assembly) for minimum distortion.


T5
T3
T2
T6
Tuner assembly
T1
T4
TC4
TC3
TC2
TC1


FM signal generator
300Ω
dummy
Distortion
meter
AC
voltmeter
Oscilloscope

FM MPX Section

1. Set FM signal generator at external modulation. Connect generator output to unit's FM antenna terminals via 300-ohm balanced dummy antenna. Set FM SG output to 60dB.
2. Adjust MPX signal generator to obtain main signal modulation of 1kHz, 67.5kHz frequency deviation. Connect to FM SG's external modulator terminals.
3. Connect the oscilloscope horizontal inputs to MPX SG's PILOT OUT terminals and Vertical inputs to No. 18 terminal of tuner assembly.
4. Tune unit and FM SG to 98MHz.
5. Produce a Lissajous pattern on oscilloscope and adjust VR1 to make the pattern still.
6. Then set signal generator for modulation of L (later R) and pilot. Adjust VR2 to obtain maximum channel separation.


Tuner assembly
VR2
VR1
18
Oscilloscope
FM signal generator
Probe
300Ω
dummy
AC
voltmeter
MPX signal generator

Power Amplifier Section

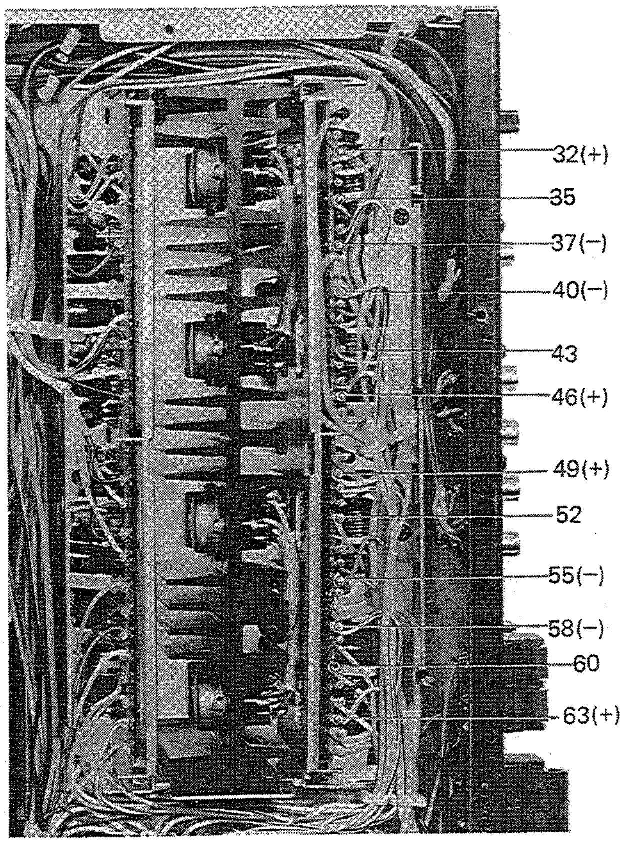
1. Do not connect load to speaker terminals. Set VOLUME control at minimum.
2. Set power boosting switch to 4CH position. Then energize unit.
3. For the first approximately six seconds, the relay remains open, keeping the unit muted. Confirm that all voltages are as indicated in the circuit diagram on page 88.
4. If voltages are greatly different from rated values, shut off power immediately. Check suspicious areas, especially power supply circuit assembly.
5. If the relay opens immediately after the power amplifier has been come into operation, a defect in the output transistors can be suspected. Check the output stage.
6. After approx. 10~20 minutes of warming-up time, adjust VR101 so that the voltage across terminals 58 and 63 of the power amplifier assembly becomes 20mV.
7. In the same way, adjust the following variable resistors to obtain 20mV voltage readings across the following terminals:

Terminals	49 — 55	VR102
Terminals	40 — 46	VR103
Terminals	32 — 37	VR104

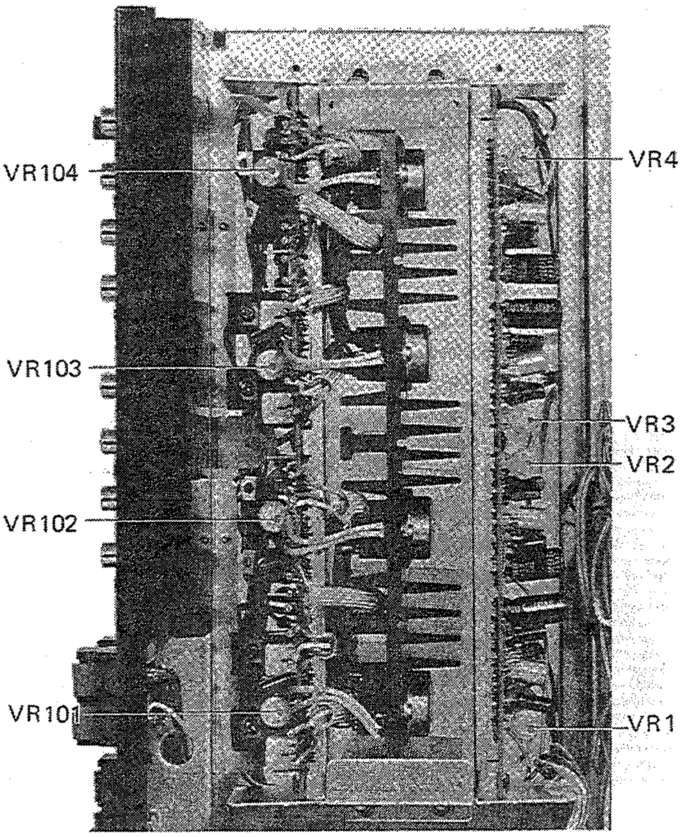
8. Next, connect voltmeter between terminal 60 and ground. Adjust VR1 to obtain 0V reading.
9. In the same way, adjust the following VRs to obtain zero readings at the following points:

Terminal	52 and ground	VR2
Terminal	43 and ground	VR3
Terminal	35 and ground	VR4

Bottom View

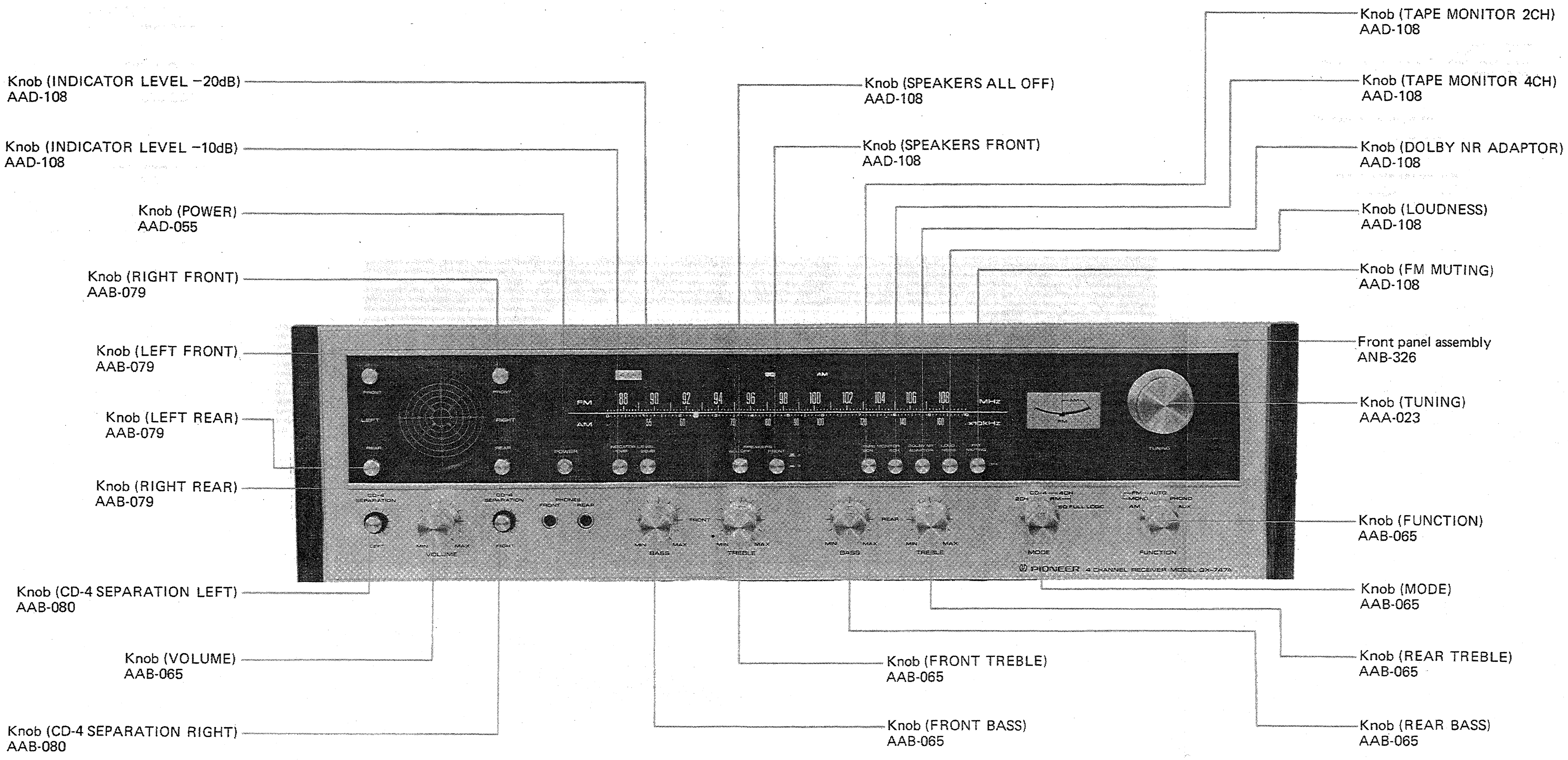


Top View

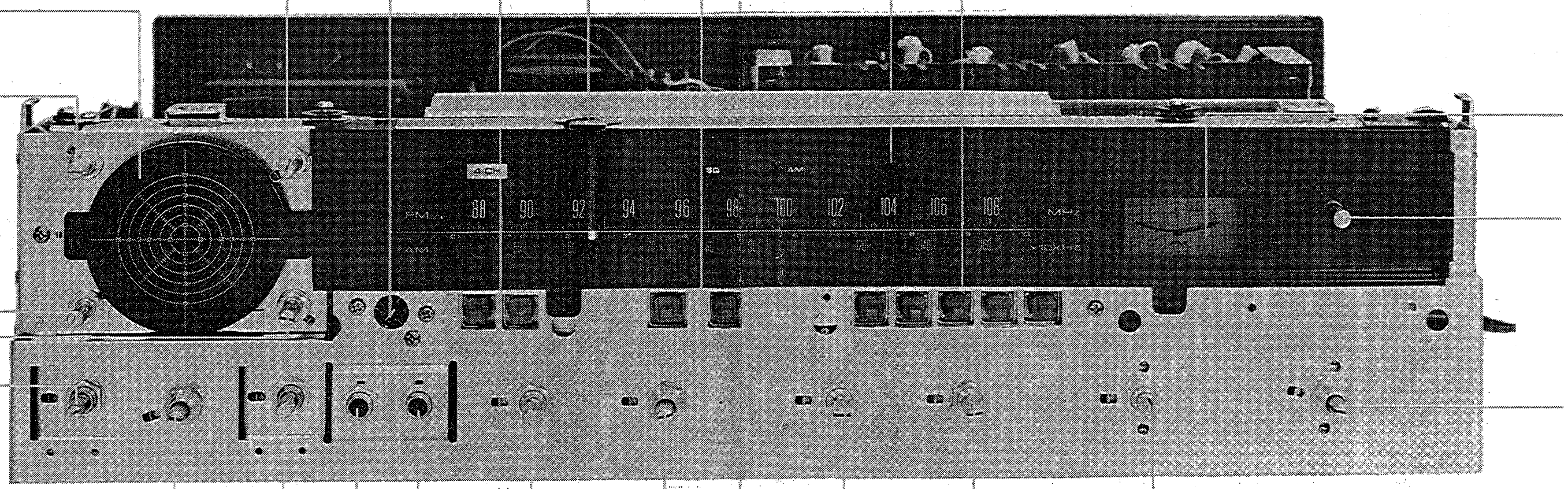


9. PARTS LOCATION

Front View 1


Knob (INDICATOR LEVEL −20dB)
AAD-108
Knob (INDICATOR LEVEL −10dB)
AAD-108
Knob (POWER)
AAD-055
Knob (RIGHT FRONT)
AAB-079
Knob (LEFT FRONT)
AAB-079
Knob (LEFT REAR)
AAB-079
Knob (RIGHT REAR)
AAB-079
Knob (CD-4 SEPARATION LEFT)
AAB-080
Knob (VOLUME)
AAB-065
Knob (CD-4 SEPARATION RIGHT)
AAB-080
Knob (SPEAKERS ALL OFF)
AAD-108
Knob (SPEAKERS FRONT)
AAD-108
Knob (FRONT TREBLE)
AAB-065
Knob (FRONT BASS)
AAB-065
Knob (TAPE MONITOR 2CH)
AAD-108
Knob (TAPE MONITOR 4CH)
AAD-108
Knob (DOLBY NR ADAPTOR)
AAD-108
Knob (LOUDNESS)
AAD-108
Knob (FM MUTING)
AAD-108
Front panel assembly
ANB-326
Knob (TUNING)
AAA-023
Knob (FUNCTION)
AAB-065
Knob (MODE)
AAB-065
Knob (REAR TREBLE)
AAB-065
Knob (REAR BASS)
AAB-065
FM
AM
88
90
92
94
96
98
100
102
104
106
108
MHz
POWER
VOLUME
BASS
TREBLE
MODE
FUNCTION
PIONEER 4 CHANNEL RECEIVER MODEL QX-747A

Front View 2 (with Panel Removed)



Push switch
(INDICATOR LEVEL −10, −20dB)
ASG-080

Push switch (POWER)
ASG-070

Variable resistor 500k-B2
(RIGHT FRONT)
ACT-008

4-channel level indicator
AAW-021

Variable resistor 500k-B2
(LEFT FRONT)
ACT-008

Variable resistor 500k-B2
(LEFT REAR)
ACT-008

Variable resistor 500k-B2
(RIGHT REAR)
ACT-008

Variable resistor 3k-B
(CD-4 SEPARATION LEFT)
ACV-017

Variable resistor 500k-B1, 4-gang
(VOLUME)
ACV-310

Variable resistor 3k-B
(CD-4 SEPARATION RIGHT)
ACV-017

Phone jack (PHONES FRONT)
AKN-002

Phone jack (PHONES REAR)
AKN-002

Dial pointer assembly
AAF-036

Push switch
(SPEAKERS ALL OFF, FRONT)
ASG-078

Dial scale plate
AAG-094

Push switch
(TAPE MONITOR 2CH, 4CH,
DOLBY NR ADAPTOR,
LOUDNESS, FM MUTING)
ASG-079

AM-FM meter
AAW-046

Tuning shaft assembly
AXA-039

Rotary switch (FUNCTION)
ASC-067

Rotary switch (MODE)
ASC-066

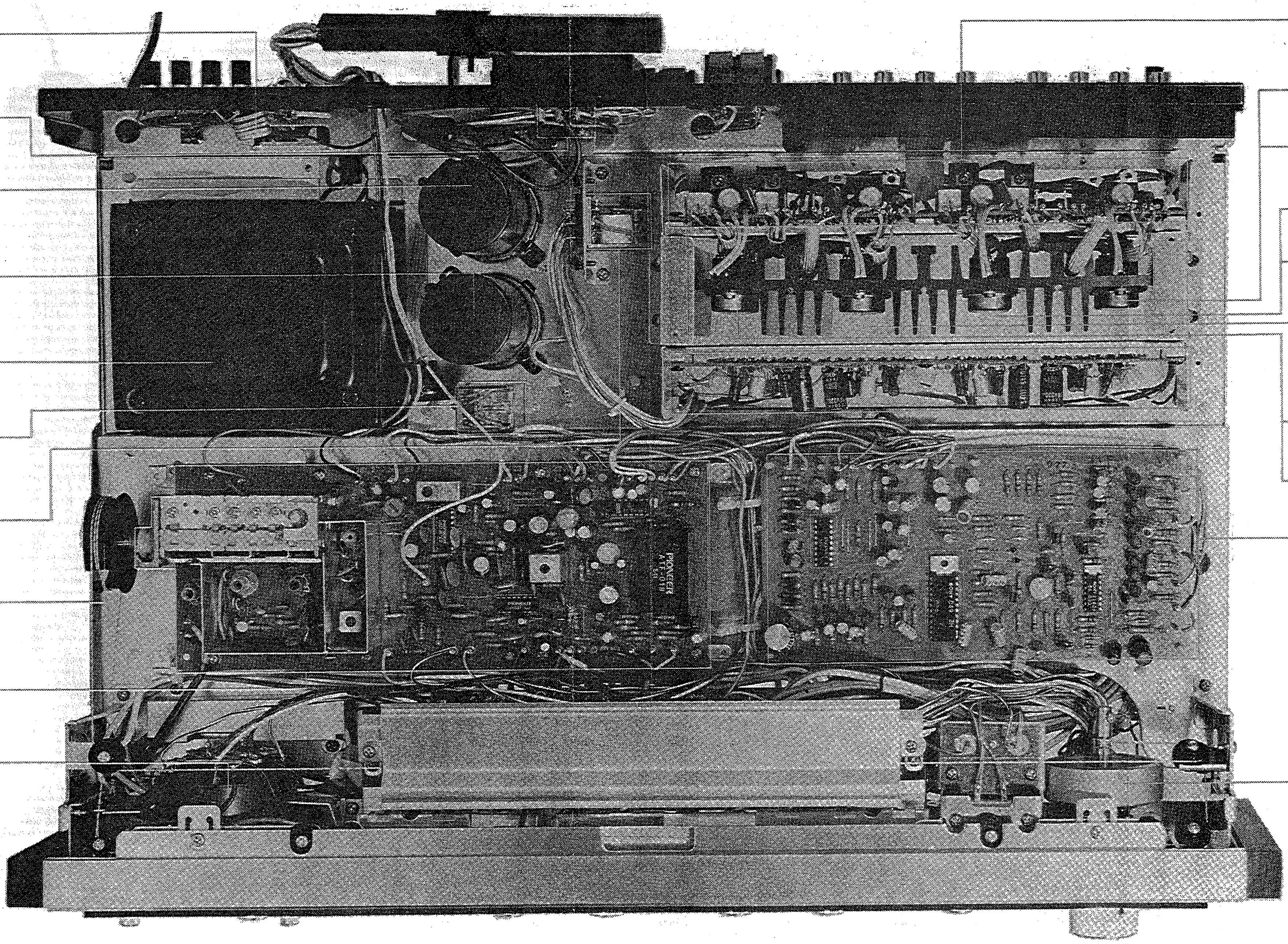
Variable resistor 100k-B, dual
(REAR TREBLE)
ACV-110

Variable resistor 100k-B, dual (FRONT TREBLE)
ACV-110

Variable resistor 100k-B, dual
(REAR BASS)
ACV-110

Variable resistor 100k-B, dual (FRONT BASS)
ACV-110

Top View



Ferrite balun
T22-025

Micro switch (switch cover)
ASF-001

Electrolytic capacitor
10,000μF 50V (C7)
ACH-029

Electrolytic capacitor
10,000μF 50V (C8)
ACH-029

Power transformer
ATT-242

Relay (S6)
ASR-007

Relay (S8)
ASR-007

Tuning drum assembly
AXA-015

Tuner assembly
AWE-056

4-channel level indicator
AAW-021

Power amplifier assembly
AWH-028

Transistor (Q112, top side)
2SD371S-R or O (2SC1030S-B or C)

Transistor (Q115, bottom side)
2SB530-R or O (2SA745-R or O)

Transistor (Q111, top side)
2SD370-R or O (2SC1403-R or O)

Transistor (Q116, bottom side)
2SB531S-R or O (2SA756S-B or C)

Transistor (Q110, top side)
2SD371S-R or O (2SC1030S-B or C)

Transistor (Q113, bottom side)
2SB530-R or O (2SA745-R or O)

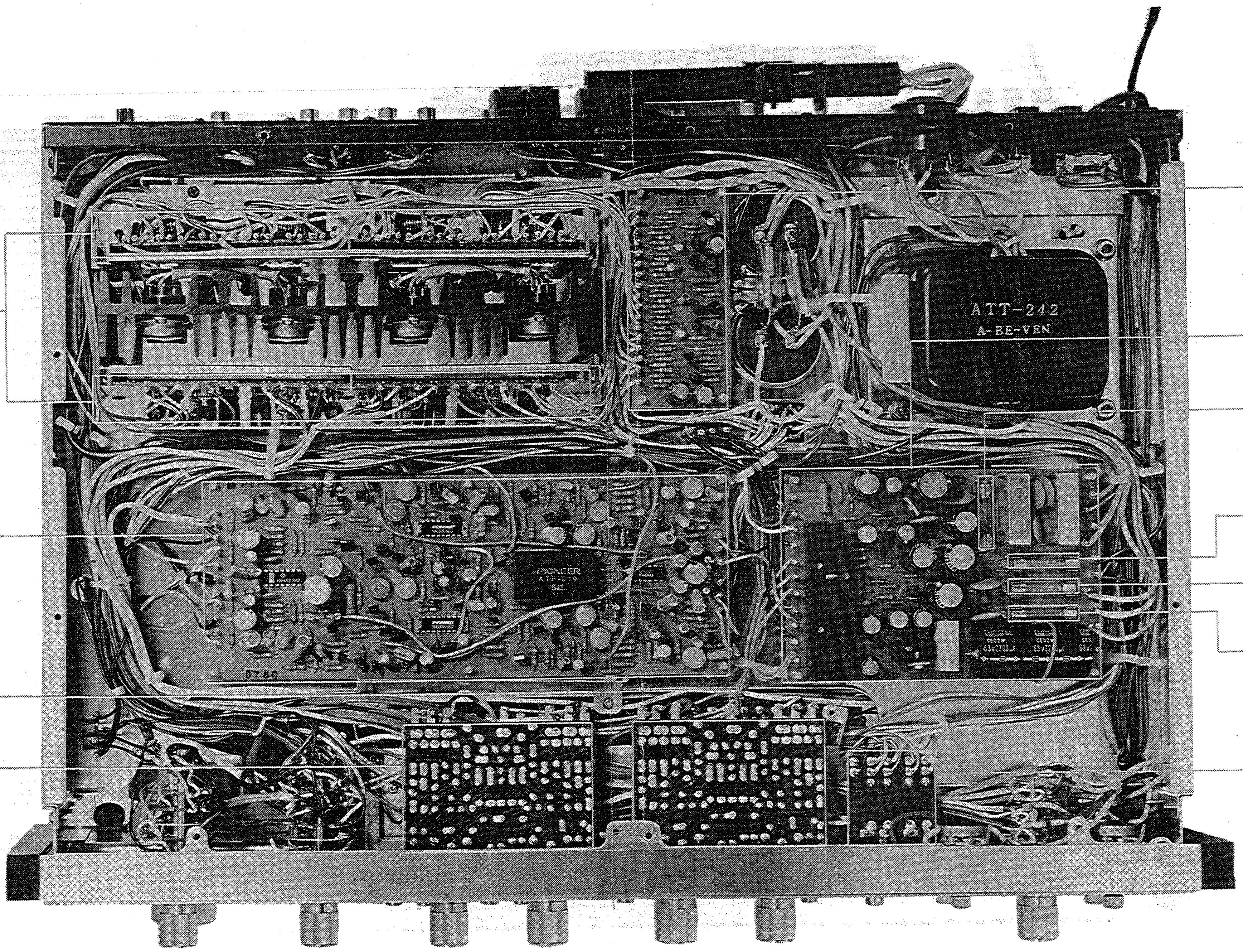
Transistor (Q109, top side)
2SD370-R or O (2SC1403-R or O)

Transistor (Q114, bottom side)
2SB531S-R or O (2SA756S-B or C)

SQ/RM decoder assembly
AWM-077

Tuning shaft assembly
AXA-039

Bottom View



Protection circuit assembly
AWM-079

Power amplifier assembly
AWH-028

Power supply circuit assembly
AWR-086

Fuse 1A (FU4)
AEK-106

Fuse 1A (FU3)
AEK-106

CD-4 assembly
AWM-076

Fuse 1A (FU2)
AEK-106

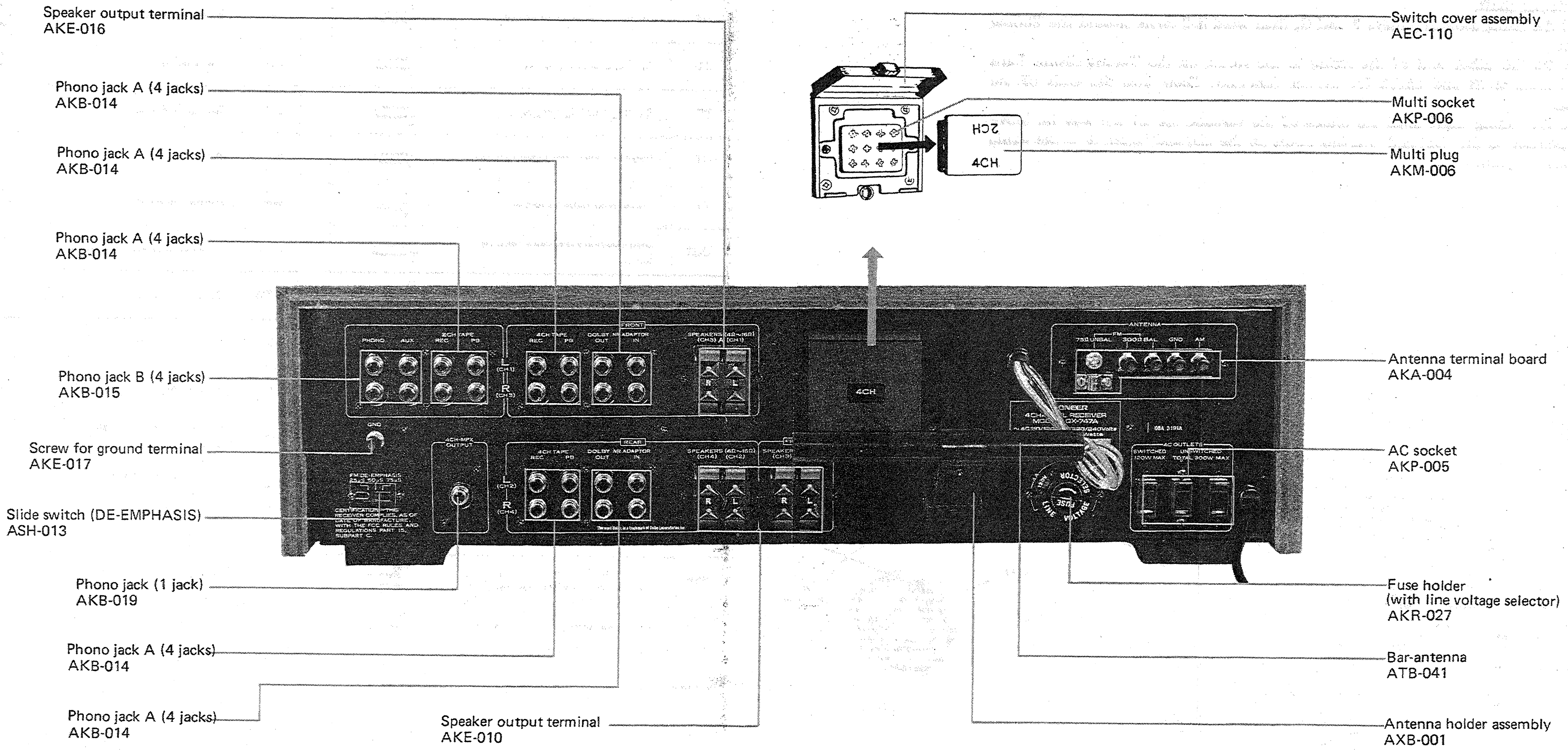
Fuse 3A (FU1)
AEK-101

Control amplifier assembly
(for CH1, CH3)
AWG-024

Control amplifier assembly
(for CH2, CH4)
AWG-024

Headphone jack assembly
AWX-054

Rear View



Speaker output terminal
AKE-016

Phono jack A (4 jacks)
AKB-014

Phono jack A (4 jacks)
AKB-014

Phono jack A (4 jacks)
AKB-014

Phono jack B (4 jacks)
AKB-015

Screw for ground terminal
AKE-017

Slide switch (DE-EMPHASIS)
ASH-013

Phono jack (1 jack)
AKB-019

Phono jack A (4 jacks)
AKB-014

Phono jack A (4 jacks)
AKB-014

Speaker output terminal
AKE-010

Switch cover assembly
AEC-110

Multi socket
AKP-006

Multi plug
AKM-006

Antenna terminal board
AKA-004

AC socket
AKP-005

Fuse holder
(with line voltage selector)
AKR-027

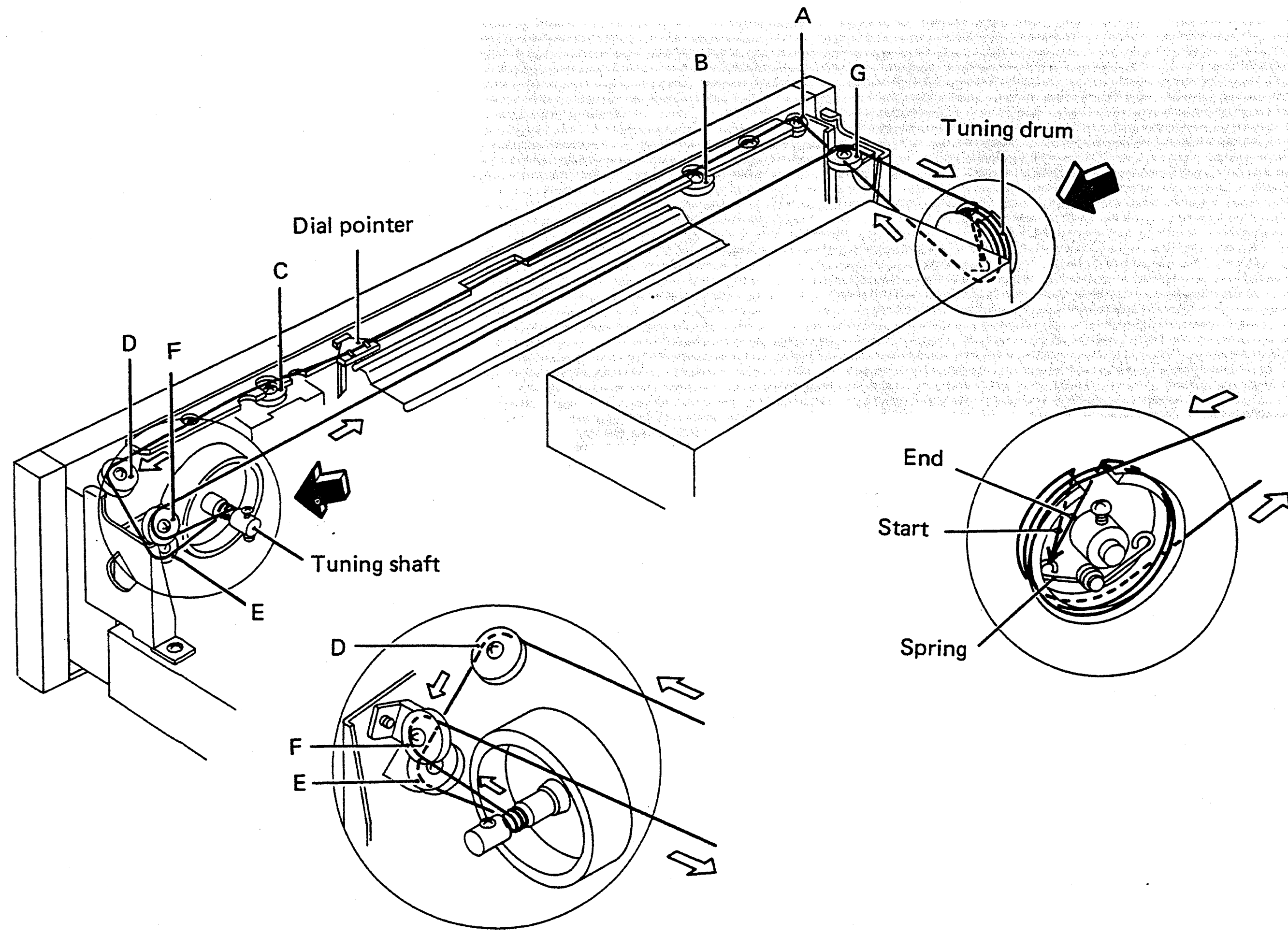
Bar-antenna
ATB-041

Antenna holder assembly
AXB-001

2CH
4CH
4CH
PHONO
AUX
2CH TAPE
REC
PB
4CH TAPE
DOLBY NR ADAPTOR
OUT
IN
FRONT
REAR
SPEAKERS
ANTENNA
GND
AM
AC OUTLETS
SWITCHED
UNSWITCHED
4CH-MPX OUTPUT
FM DE-EMPHASIS
FUSE
LINE VOLTAGE SELECTOR
L
R

10. DIAL CORD STRINGING

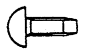
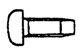
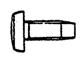
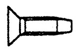
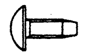
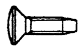
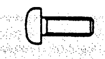
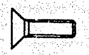
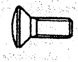
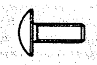
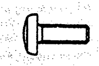
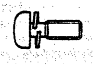
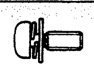
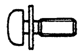
1. Turn the tuning capacitor so that its plates protrude as much as possible.
2. Tie one end of the string to the spring on the Tuning drum (attached to the tuning capacitor).
3. Lead the string around pulleys A, B, C, D and E, then wind it 3 turns around the tuning shaft.
4. Lead the string around pulleys F and G, then wind it 2 turns around the Tuning drum.
5. Now tie the other end of the string to the spring on the Tuning drum. Turn the tuning shaft and check for proper function. Then trim the ends of the string.
6. Turn the tuning shaft until the plates of the varialbe are all the way in. Move the pointer to the left-end starting point on the dial and fasten it to the string in that position.

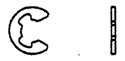
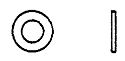
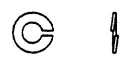
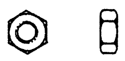
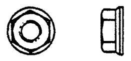
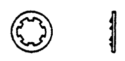
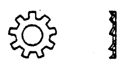
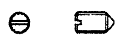
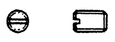
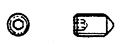
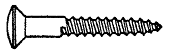
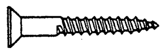
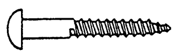


11. EXPLODED VIEWS

NOMENCLATURE OF SCREWS, WASHERS AND NUTS

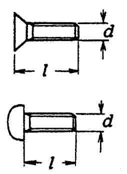
The following symbols stand for screws, washers and nuts as shown in exploded view.

Symbol	Description	Shape
RT	Brazier head tapping screw	
PT	Pan head tapping screw	
BT	Binding head tapping screw	
CT	Countersunk head tapping screw	
TT	Truss head tapping screw	
OCT	Oval countersunk head tapping screw	
PM	Pan head machine screw	
CM	Countersunk head machine screw	
OCM	Oval countersunk head machine screw	
TM	Truss head machine screw	
BM	Binding head machine screw	
PSA	Pan head screw with spring lock washer	
PSB	Pan head screw with spring lock washer and flat washer	
PSF	Pan head screw with flat washer	

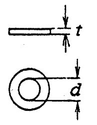
Symbol	Description	Shape
EW	E type washer	
FW	Flat washer	
SW	Spring lock washer	
N	Nut	
WN	Washer faced nut	
ITW	Internal toothed lock washer	
OTW	Outernal toothed lock washer	
SC	Slotted set screw (Cone point)	
SF	Slotted set screw (Flat point)	
HS	Hexagon socket headless set screw	
OCW	Oval countersunk head wood screw	
CW	Countersunk head wood screw	
RW	Round head wood screw	

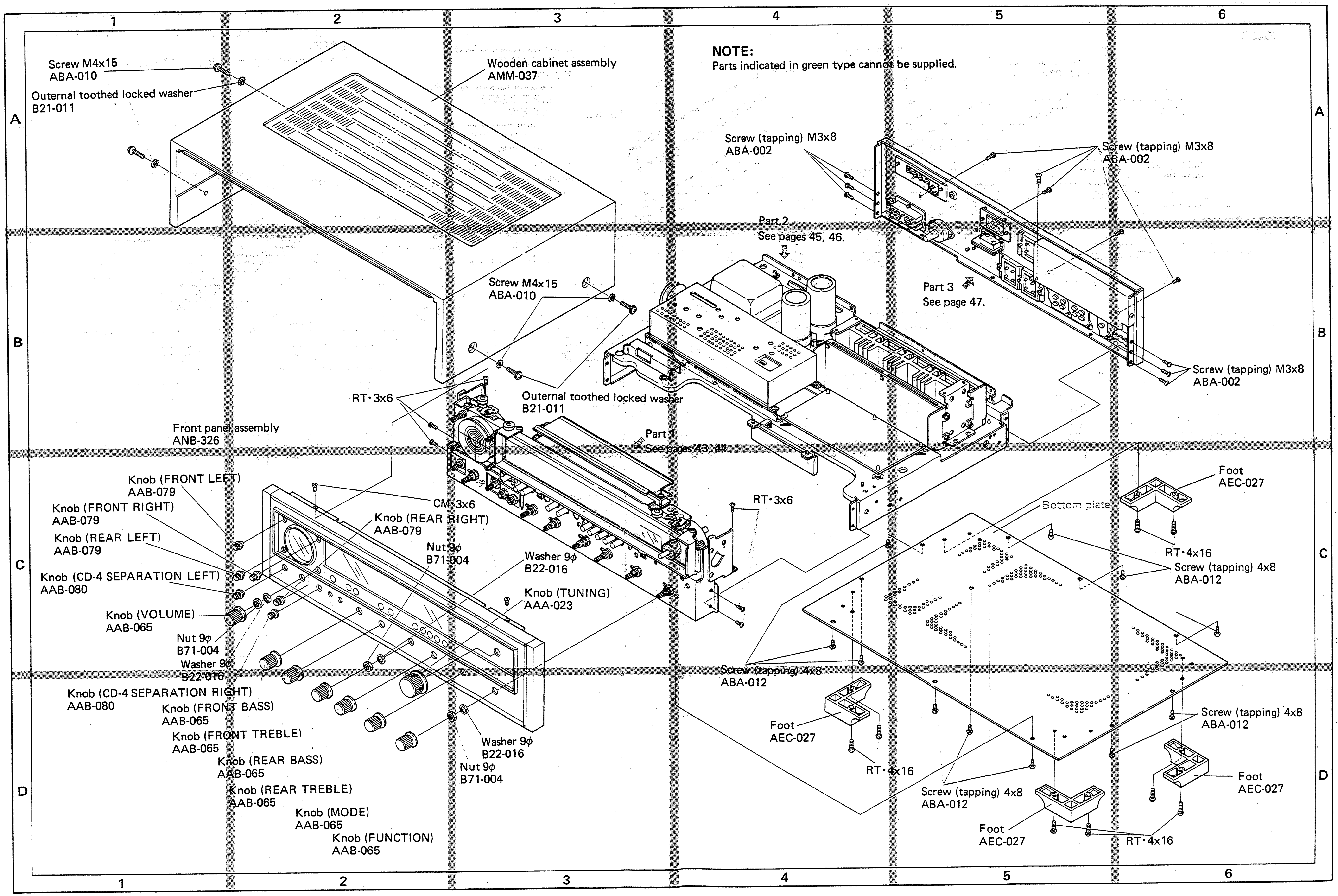
EXAMPLE

PM·3x8
- length in mm (*l*)
- diameter in mm (*d*)
- Symbol



FW·9ϕx1^t
- thickness in mm (*t*)
- diameter in mm (*d*)
- Symbol



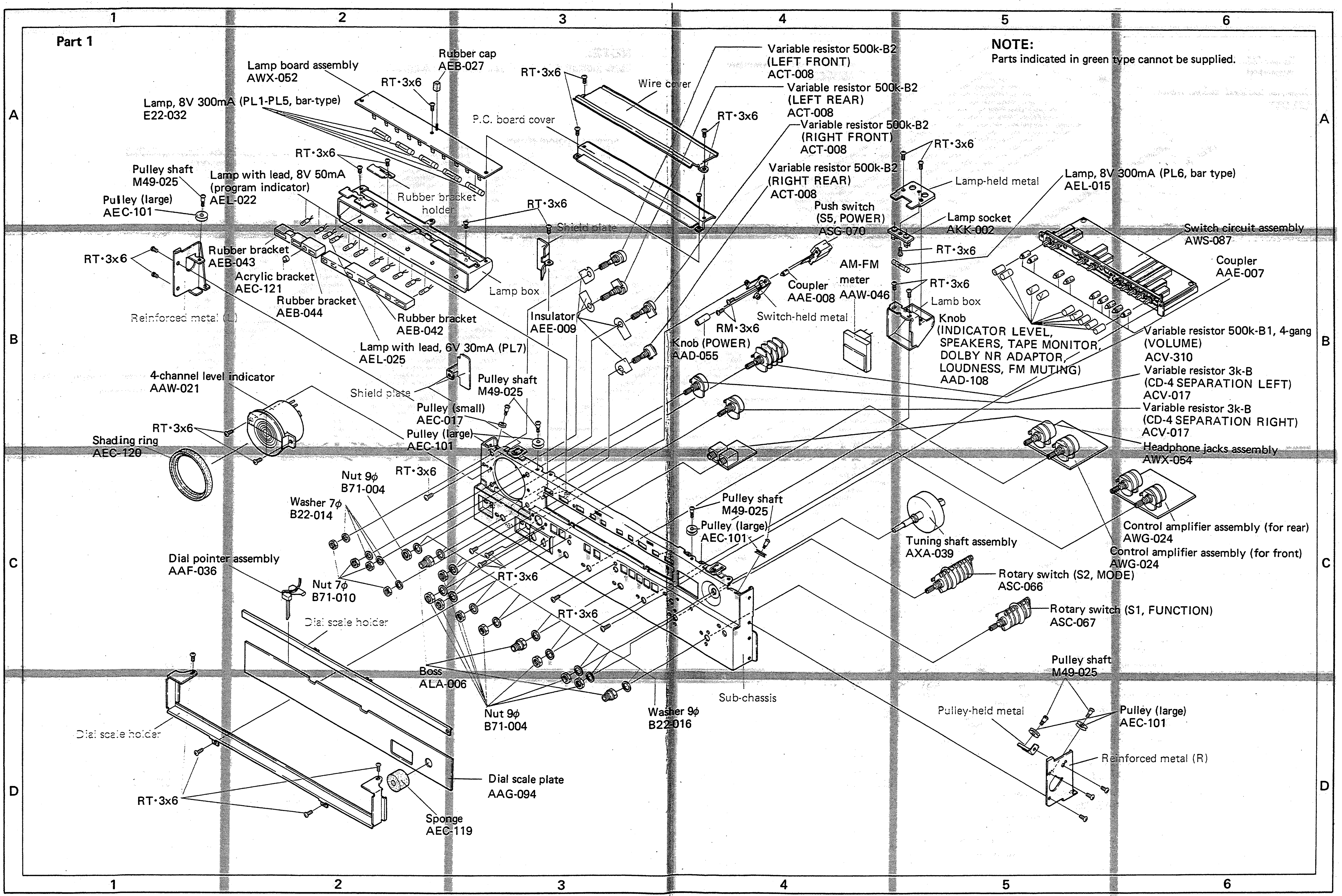


NOTE:
Parts indicated in green type cannot be supplied.

1
2
3
4
5
6
A
B
C
D
Screw M4x15
ABA-010
Outernal toothed locked washer
B21-011
Wooden cabinet assembly
AMM-037
Screw (tapping) M3x8
ABA-002
Screw (tapping) M3x8
ABA-002
Part 2
See pages 45, 46.
Part 3
See page 47.
Screw M4x15
ABA-010
Screw (tapping) M3x8
ABA-002
RT・3x6
Outernal toothed locked washer
B21-011
Front panel assembly
ANB-326
Part 1
See pages 43, 44.
Knob (FRONT LEFT)
AAB-079
Knob (FRONT RIGHT)
AAB-079
Knob (REAR LEFT)
AAB-079
Knob (CD-4 SEPARATION LEFT)
AAB-080
Knob (VOLUME)
AAB-065
Nut 9ϕ
B71-004
Washer 9ϕ
B22-016
Knob (CD-4 SEPARATION RIGHT)
AAB-080
Knob (FRONT BASS)
AAB-065
Knob (FRONT TREBLE)
AAB-065
Knob (REAR BASS)
AAB-065
Knob (REAR TREBLE)
AAB-065
Knob (MODE)
AAB-065
Knob (FUNCTION)
AAB-065
CM・3x6
Knob (REAR RIGHT)
AAB-079
Nut 9ϕ
B71-004
Washer 9ϕ
B22-016
Knob (TUNING)
AAA-023
Washer 9ϕ
B22-016
Nut 9ϕ
B71-004
RT・3x6
Foot
AEC-027
Bottom plate
RT・4x16
Screw (tapping) 4x8
ABA-012
Screw (tapping) 4x8
ABA-012
Foot
AEC-027
RT・4x16
Screw (tapping) 4x8
ABA-012
Screw (tapping) 4x8
ABA-012
Foot
AEC-027
Foot
AEC-027
RT・4x16
1
2
3
4
5
6

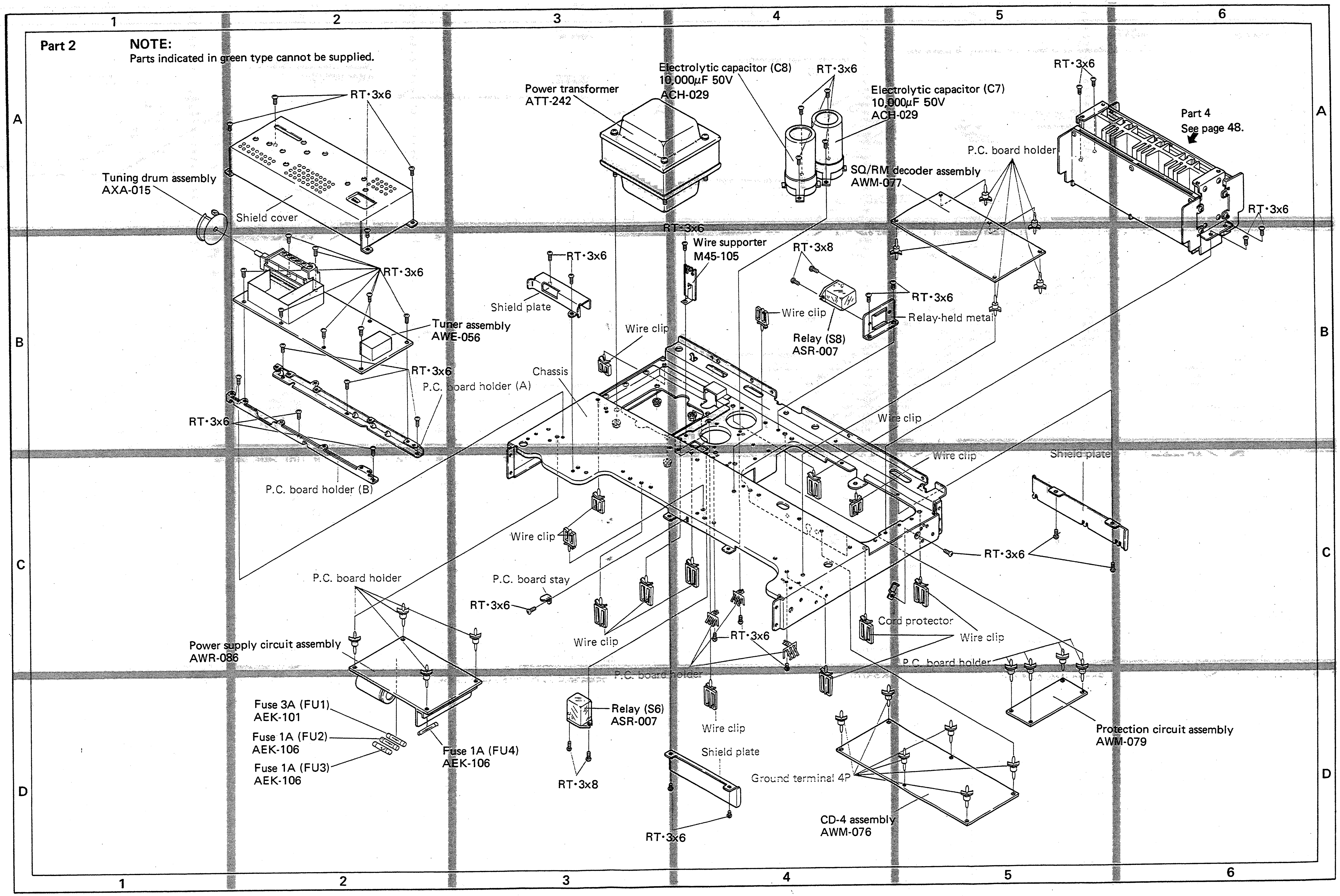
Part 1

NOTE:
Parts indicated in green type cannot be supplied.


1
2
3
4
5
6
A
B
C
D
Lamp board assembly
AWX-052
Rubber cap
AEB-027
RT•3x6
Lamp, 8V 300mA (PL1-PL5, bar-type)
E22-032
P.C. board cover
Wire cover
RT•3x6
Pulley shaft
M49-025
Pulley (large)
AEC-101
Lamp with lead, 8V 50mA
(program indicator)
AEL-022
Rubber bracket holder
RT•3x6
Shield plate
RT•3x6
Rubber bracket
AEB-043
Acrylic bracket
AEC-121
Rubber bracket
AEB-044
Reinforced metal (L)
Lamp box
Rubber bracket
AEB-042
Insulator
AEE-009
Lamp with lead, 6V 30mA (PL7)
AEL-025
4-channel level indicator
AAW-021
Shield plate
Pulley shaft
M49-025
Pulley (small)
AEC-017
Pulley (large)
AEC-101
RT•3x6
Shading ring
AEC-120
Nut 9ϕ
B71-004
RT•3x6
Washer 7ϕ
B22-014
Dial pointer assembly
AAF-036
Nut 7ϕ
B71-010
RT•3x6
RT•3x6
Dial scale holder
Boss
ALA-006
Nut 9ϕ
B71-004
Washer 9ϕ
B22-016
Sub-chassis
Dial scale holder
RT•3x6
Dial scale plate
AAG-094
Sponge
AEC-119
Variable resistor 500k-B2
(LEFT FRONT)
ACT-008
Variable resistor 500k-B2
(LEFT REAR)
ACT-008
RT•3x6
Variable resistor 500k-B2
(RIGHT FRONT)
ACT-008
Variable resistor 500k-B2
(RIGHT REAR)
ACT-008
Push switch
(S5, POWER)
ASG-070
Coupler
AAE-008
AM-FM meter
AAW-046
Switch-held metal
RM•3x6
Knob (POWER)
AAD-055
RT•3x6
Lamp-held metal
Lamp socket
AKK-002
RT•3x6
RT•3x6
Lamb box
Knob
(INDICATOR LEVEL,
SPEAKERS, TAPE MONITOR,
DOLBY NR ADAPTOR,
LOUDNESS, FM MUTING)
AAD-108
Lamp, 8V 300mA (PL6, bar type)
AEL-015
Switch circuit assembly
AWS-087
Coupler
AAE-007
Variable resistor 500k-B1, 4-gang
(VOLUME)
ACV-310
Variable resistor 3k-B
(CD-4 SEPARATION LEFT)
ACV-017
Variable resistor 3k-B
(CD-4 SEPARATION RIGHT)
ACV-017
Headphone jacks assembly
AWX-054
Pulley shaft
M49-025
Pulley (large)
AEC-101
Tuning shaft assembly
AXA-039
Control amplifier assembly (for rear)
AWG-024
Control amplifier assembly (for front)
AWG-024
Rotary switch (S2, MODE)
ASC-066
Rotary switch (S1, FUNCTION)
ASC-067
Pulley shaft
M49-025
Pulley-held metal
Pulley (large)
AEC-101
Reinforced metal (R)

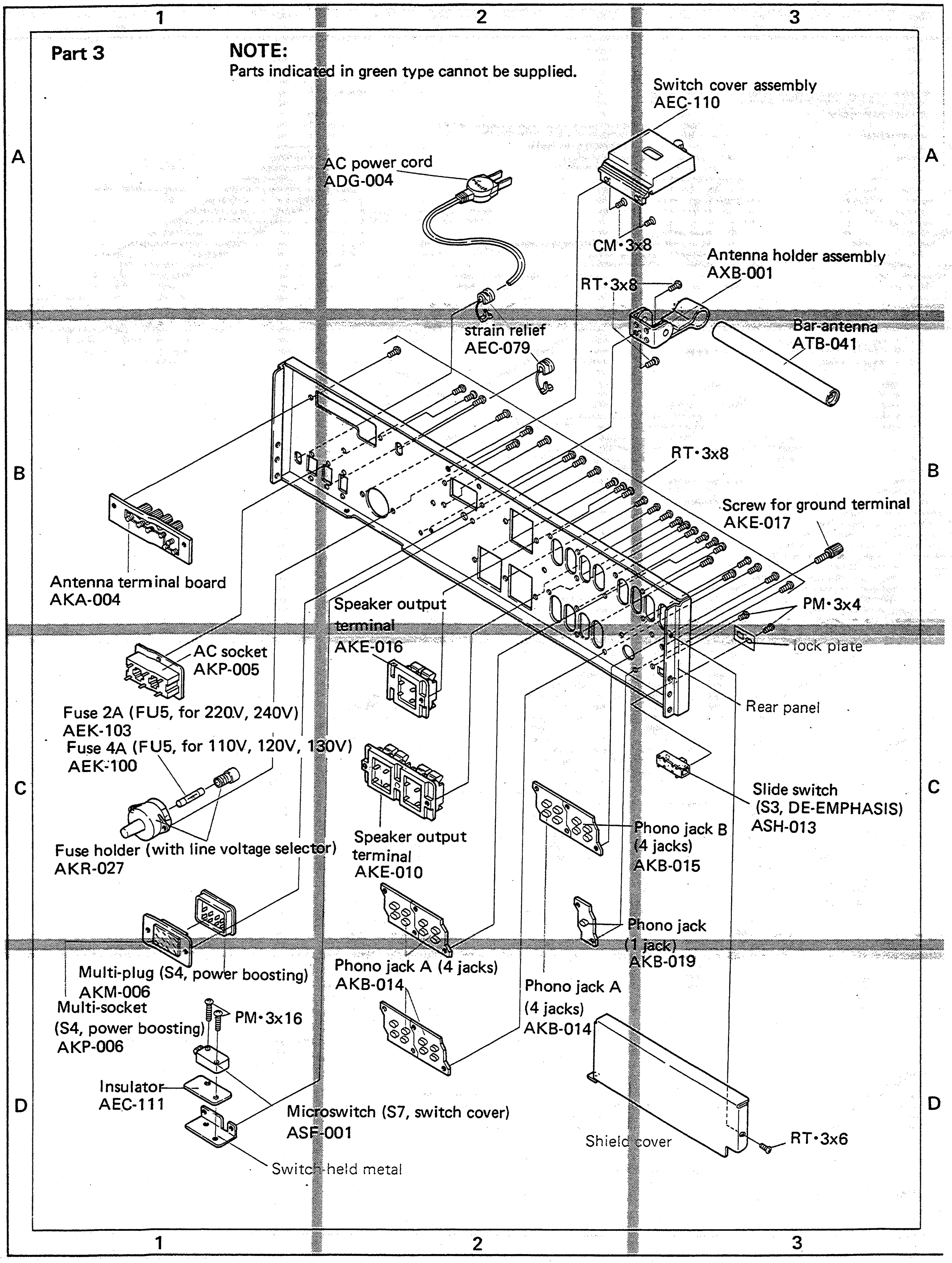
Part 2

NOTE:
Parts indicated in green type cannot be supplied.


1
2
3
4
5
6
A
B
C
D
RT·3x6
Tuning drum assembly
AXA-015
Shield cover
RT·3x6
Tuner assembly
AWE-056
RT·3x6
P.C. board holder (A)
RT·3x6
P.C. board holder (B)
Power transformer
ATT-242
Electrolytic capacitor (C8)
10,000μF 50V
ACH-029
RT·3x6
Electrolytic capacitor (C7)
10,000μF 50V
ACH-029
RT·3x6
Part 4
See page 48.
P.C. board holder
SQ/RM decoder assembly
AWM-077
RT·3x6
RT·3x6
Wire supporter
M45-105
RT·3x6
Shield plate
RT·3x8
RT·3x6
Wire clip
Relay-held metal
Relay (S8)
ASR-007
Wire clip
Chassis
Wire clip
Wire clip
Shield plate
Wire clip
RT·3x6
P.C. board holder
P.C. board stay
RT·3x6
Power supply circuit assembly
AWR-086
Wire clip
RT·3x6
Cord protector
Wire clip
P.C. board holder
P.C. board holder
Fuse 3A (FU1)
AEK-101
Fuse 1A (FU2)
AEK-106
Fuse 1A (FU3)
AEK-106
Fuse 1A (FU4)
AEK-106
Relay (S6)
ASR-007
RT·3x8
Wire clip
Shield plate
RT·3x6
Ground terminal 4P
CD-4 assembly
AWM-076
Protection circuit assembly
AWM-079

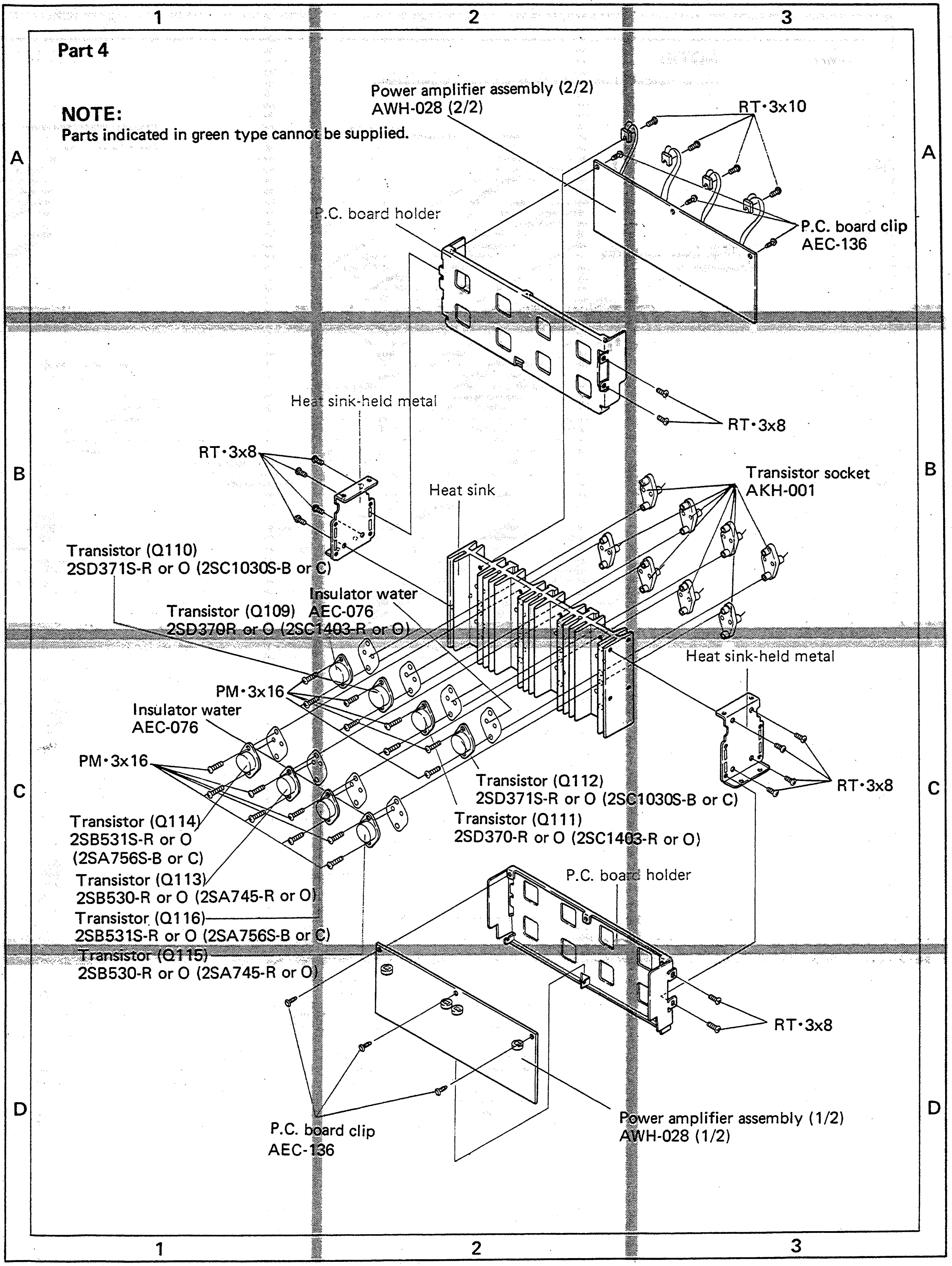
Part 3

NOTE:
Parts indicated in green type cannot be supplied.


1
2
3
A
B
C
D
Switch cover assembly
AEC-110
AC power cord
ADG-004
CM·3x8
Antenna holder assembly
AXB-001
RT·3x8
strain relief
AEC-079
Bar-antenna
ATB-041
RT·3x8
Screw for ground terminal
AKE-017
Antenna terminal board
AKA-004
Speaker output terminal
AKE-016
PM·3x4
lock plate
AC socket
AKP-005
Rear panel
Fuse 2A (FU5, for 220V, 240V)
AEK-103
Fuse 4A (FU5, for 110V, 120V, 130V)
AEK-100
Slide switch
(S3, DE-EMPHASIS)
ASH-013
Fuse holder (with line voltage selector)
AKR-027
Speaker output terminal
AKE-010
Phono jack B
(4 jacks)
AKB-015
Phono jack
(1 jack)
AKB-019
Multi-plug (S4, power boosting)
AKM-006
Phono jack A (4 jacks)
AKB-014
Phono jack A
(4 jacks)
AKB-014
Multi-socket
(S4, power boosting)
AKP-006
PM·3x16
Insulator
AEC-111
Microswitch (S7, switch cover)
ASF-001
Shield cover
RT·3x6
Switch-held metal

Part 4

NOTE:
Parts indicated in green type cannot be supplied.

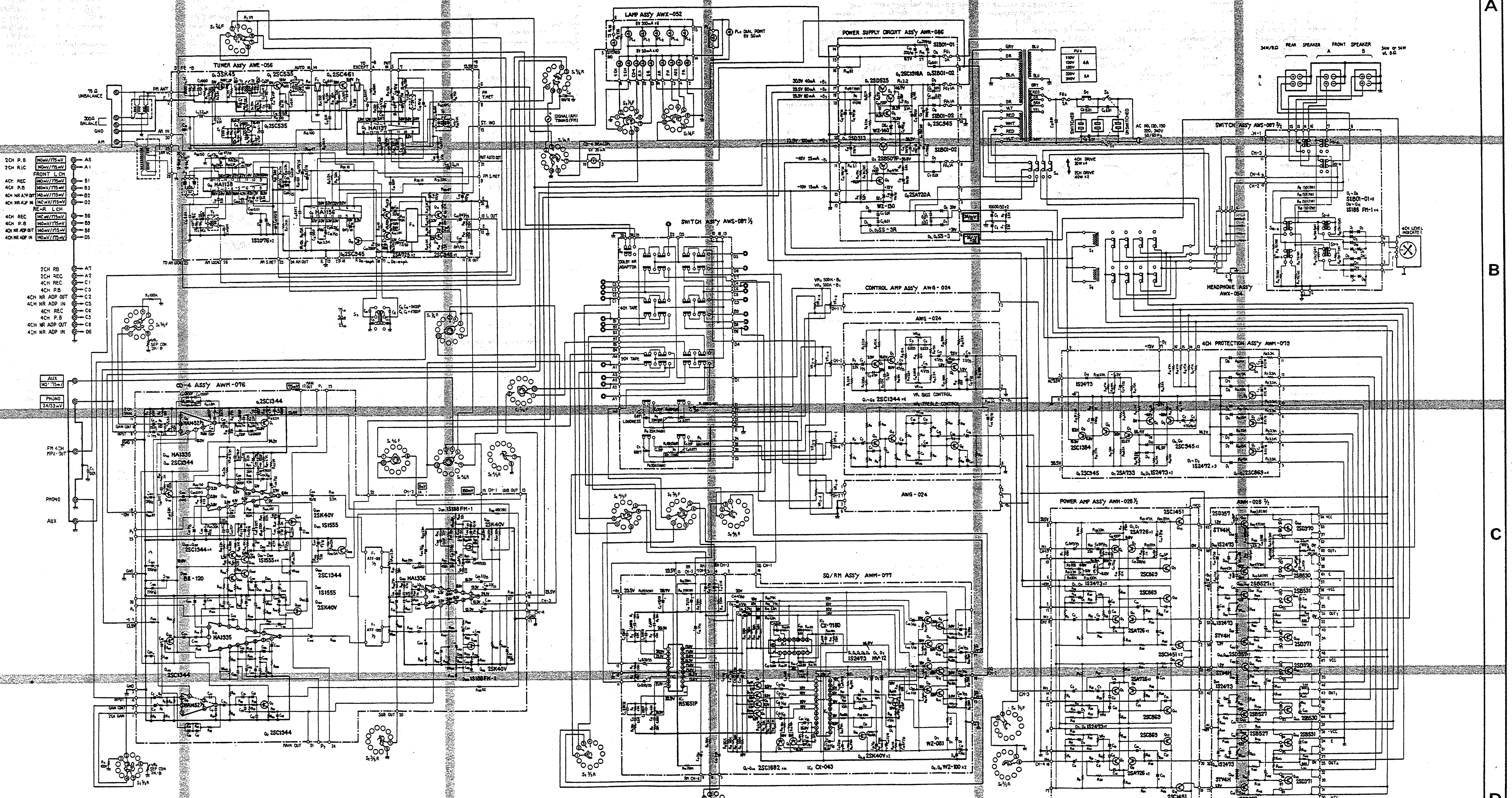

1
2
3
A
B
C
D
Power amplifier assembly (2/2)
AWH-028 (2/2)
RT·3x10
P.C. board holder
P.C. board clip
AEC-136
Heat sink-held metal
RT·3x8
RT·3x8
Heat sink
Transistor socket
AKH-001
Transistor (Q110)
2SD371S-R or O (2SC1030S-B or C)
Insulator water
AEC-076
Transistor (Q109)
2SD370R or O (2SC1403-R or O)
Heat sink-held metal
PM·3x16
Insulator water
AEC-076
PM·3x16
RT·3x8
Transistor (Q112)
2SD371S-R or O (2SC1030S-B or C)
Transistor (Q114)
2SB531S-R or O
(2SA756S-B or C)
Transistor (Q111)
2SD370-R or O (2SC1403-R or O)
Transistor (Q113)
2SB530-R or O (2SA745-R or O)
P.C. board holder
Transistor (Q116)
2SB531S-R or O (2SA756S-B or C)
Transistor (Q115)
2SB530-R or O (2SA745-R or O)
RT·3x8
P.C. board clip
AEC-136
Power amplifier assembly (1/2)
AWH-028 (1/2)

1 2 3 4 5 6

12. SCHEMATIC DIAGRAMS, P.C. BOARD PATTERNS AND PARTS LISTS

12.1 SCHEMATIC DIAGRAM AND MISCELLANEOUS PARTS

A B C D


TUNER Assy AWE-056
LAMP Assy AWX-052
POWER SUPPLY CIRCUIT Ass'y AWR-086
SWITCH Assy AWS-087½
SWITCH Ass'y AWS-087½
CONTROL AMP Ass'y AWG-024
AWG-024
4CH PROTECTION Ass'y AWM-075
HEADPHONE Ass'y AWX-054
CD-4 Assy AWM-076
SQ/RM Ass'y AWM-077
POWER AMP Ass'y AWH-028½
AWH-028½
75Ω UNBALANCE
300Ω BALANCE
GND
AM
AUX
PHONO
FM 4CH MPX OUT
REAR SPEAKER
FRONT SPEAKER
AC 110, 120, 130 220, 240V 50/60Hz

NOTES

S₁ : FUNCTION SWITCH
1. AM 2. FM-MONO 3. FM-AUTO
4. PHONO 5. AUX

S₂ : MODE SWITCH
1. 2CH 2. 4CH-CD-4 3. RM
4. SQ FULL LOGIC

S₃ : FM DE-EMPHASIS SWITCH
25μ —— 50μ —— 75μ

S₄ : POWER BOOSTING SWITCH
4CH —— 2CH

S₅ : POWER SWITCH
OFF —— ON

S₆,₈ : RELAY

S₇ : MICRO SWITCH

S₉ : INDICATOR LEVEL -20 dB
ON —— OFF

S₁₀ : INDICATOR LEVEL -10 dB
ON —— OFF

S₁₁ : MUTING SWITCH
OFF —— ON

S₁₂ : SPEAKER FRONT
A —— B

S₁₃ : SPEAKER ALL
ON —— OFF

VR₁,₂ : CD-4
CHANNEL SEPARATION

VR₃ : BALANCE VOLUME

VR₄ : MAIN VOLUME

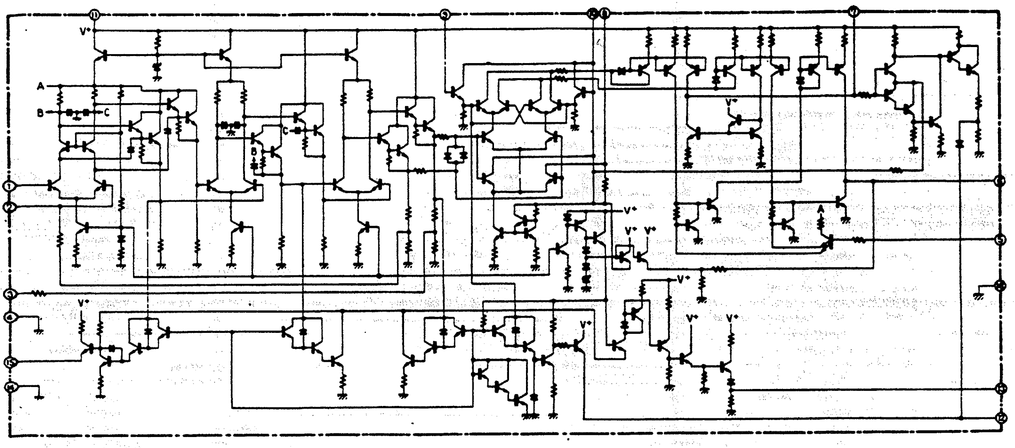
RESISTORS
IN OHM, 1/4W, ±5% TOLERANCE
UNLESS OTHERWISE NOTED.

CAPACITORS
IN μF UNLESS OTHERWISE NOTED.
P : pF

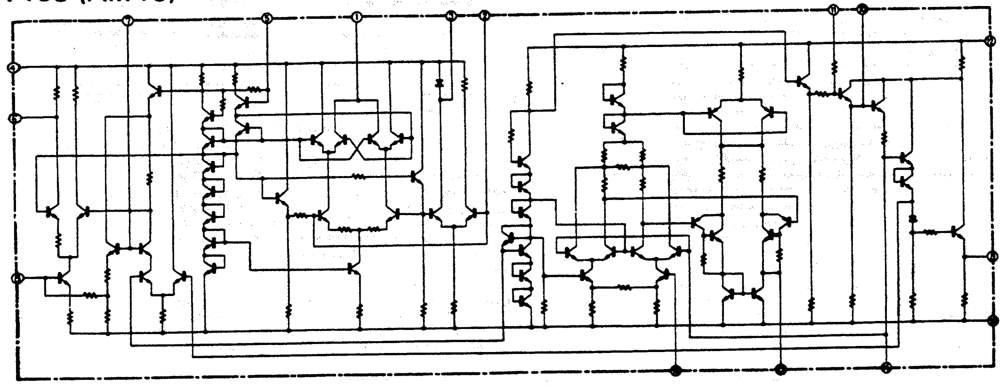
⧄ DC VOLTAG IS SHOWN AT FOLLOWING : 4CH/2CH

1 2 3 4 5 6

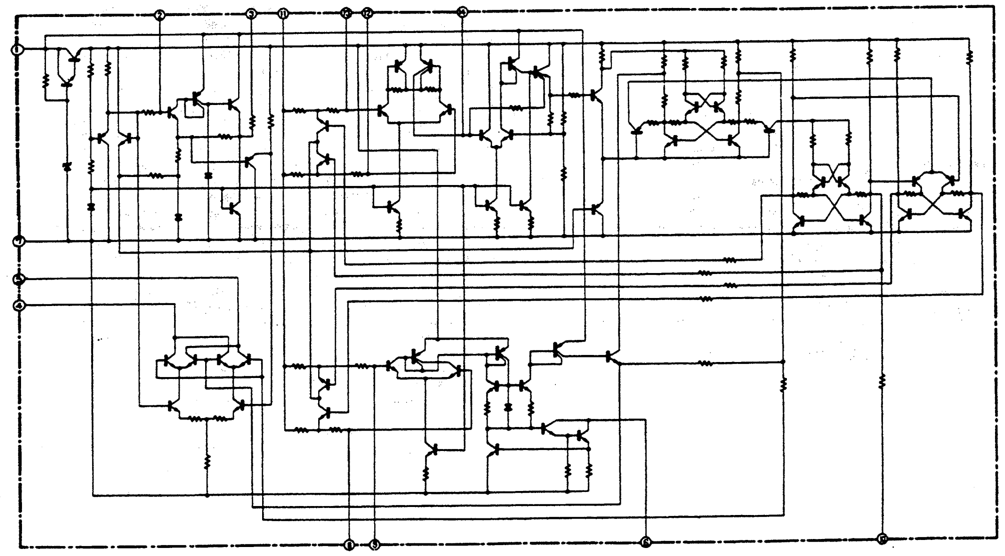
HA1137 (FM IF IC)



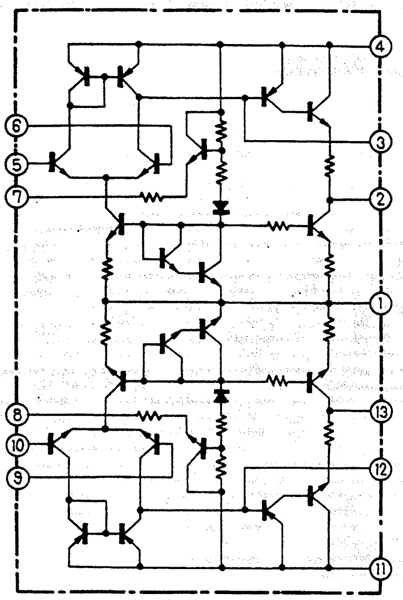
HA1138 (AM IC)



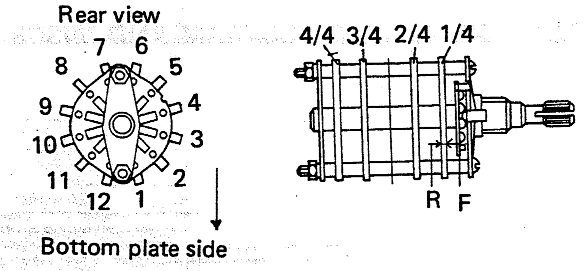
HA1156 (FM MPX IC)



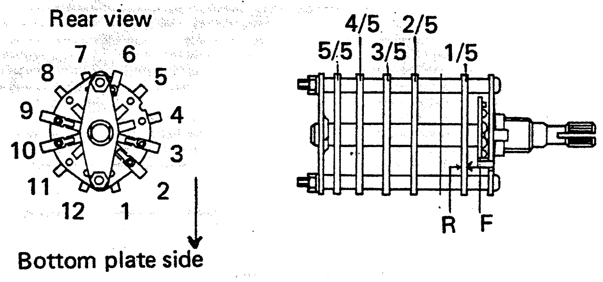
HA1452 (EQ AMP. IC)


4
6
5
7
3
2
1
8
10
9
13
12
11

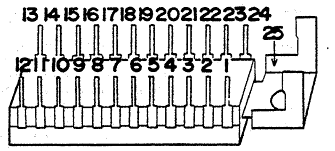
S1 (FUNCTION)


Rear view
1
2
3
4
5
6
7
8
9
10
11
12
4/4 3/4 2/4 1/4
R F
Bottom plate side

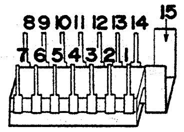
S2 (MODE)


Rear view
1
2
3
4
5
6
7
8
9
10
11
12
4/5 2/5
5/5 3/5 1/5
R F
Bottom plate side

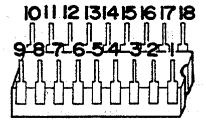
CX-049


13 14 15 16 17 18 19 20 21 22 23 24
12 11 10 9 8 7 6 5 4 3 2 1
25

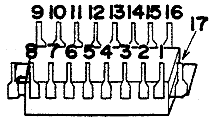
CX718D


8 9 10 11 12 13 14
15
7 6 5 4 3 2 1

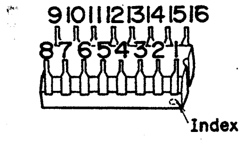
M51651P


10 11 12 13 14 15 16 17 18
9 8 7 6 5 4 3 2 1

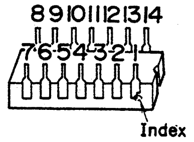
HA1335


9 10 11 12 13 14 15 16
17
8 7 6 5 4 3 2 1

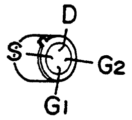
HA1137
HA1138
HA1336


9 10 11 12 13 14 15 16
8 7 6 5 4 3 2 1
Index

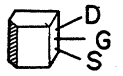
HA1156
HA1452


8 9 10 11 12 13 14
7 6 5 4 3 2 1
Index

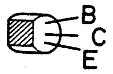
3SK45



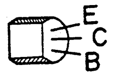
2SK40V



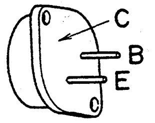
2SA720A
2SA733
2SA763P
2SC945
2SC1318A



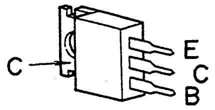
2SA725
2SA726
2SC869
2SC1312



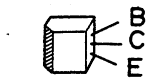
2SB530
2SB531
2SD370
2SD371



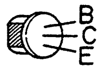
2SB507
2SD313
2SD525



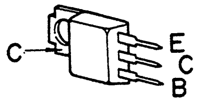
2SC461
2SC535
2SC1344



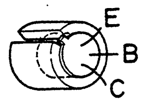
2SC1682



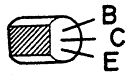
2SB527
2SD357



2SC1451



2SC1384



Miscellaneous Parts

CAPACITORS

Symbol	Description			Part No.
C1	Ceramic	0.01	50V	CKDYF 103Z 50
C2	Mylar	0.0047	50V	CQMA 472J 50
C3	Mylar	0.0047	50V	CQMA 472J 50
C4	Ceramic	0.01	250V	ACG-001
C5	Ceramic	0.01	250V	ACG-001
C6	Ceramic	0.01	250V	ACG-001
C7	Electrolytic	10,000	50V	ACH-029
C8	Electrolytic	10,000	50V	ACH-029
C9	Mylar	0.0091	50V	CQMA 912J 50
C10	Mylar	0.0091	50V	CQMA 912J 50
C11	Ceramic	0.01	250V	ACG-001
C12	Electrolytic	100	16V	CEA 101P 16

RESISTORS

Symbol	Description	Part No.
R1	Carbon film 1M	RD¼PS 105J
R2	Carbon film 100k	RD¼PS 104J
R3	Carbon film 100k	RD¼PS 104J
R4	Metal oxide 3.3k 3W	RS3P 332J
R5	Metal oxide 3.3k 3W	RS3P 332J
VR1	Variable resistor 3k-B (CD-4 SEPARATION LEFT)	ACV-017
VR2	Variable resistor 3k-B (CD-4 SEPARATION RIGHT)	ACV-017
VR3a	Variable resistor 500k-B2 (FRONT L level)	ACT-008
VR3b	Variable resistor 500k-B2 (REAR R level)	ACT-008
VR3c	Variable resistor 500k-B2 (FRONT L level)	ACT-008
VR3d	Variable resistor 500k-B2 (REAR R level)	ACT-008
VR4	Variable resistor 500k-B1, 4-gang (VOLUME)	ACV-310

LAMPS

Symbol	Description	Part No.
PL1–PL5	Lamp 8V, 300mA, bar type (Dial illumination)	E22-032
PL6	Lamp 8V, 300mA, bar type (Meter illumination)	AEL-015
PL7	Lamp 6V, 30mA, with leads (CD-4 indicator)	AEL-025
	Lamp 8V, 50mA, with leads (Program indicator)	AEL-022

NOTE:
- *Capacitors: in µF unless otherwise noted p:pF*
- *Resistors: in Ω, ¼W unless otherwise noted k:kΩ, M:MΩ*

FUSES

Symbol	Description	Part No.
FU1	Fuse 3A (lamp circuit)	AEK-101
FU2	Fuse 1A (secondary)	AEK-106
FU3	Fuse 1A (secondary)	AEK-106
FU4	Fuse 1A (secondary)	AEK-106
FU5	Fuse 2A (220V, 240V, primary) or 4A (110V, 120V, 130V, primary)	AEK-103 AEK-100

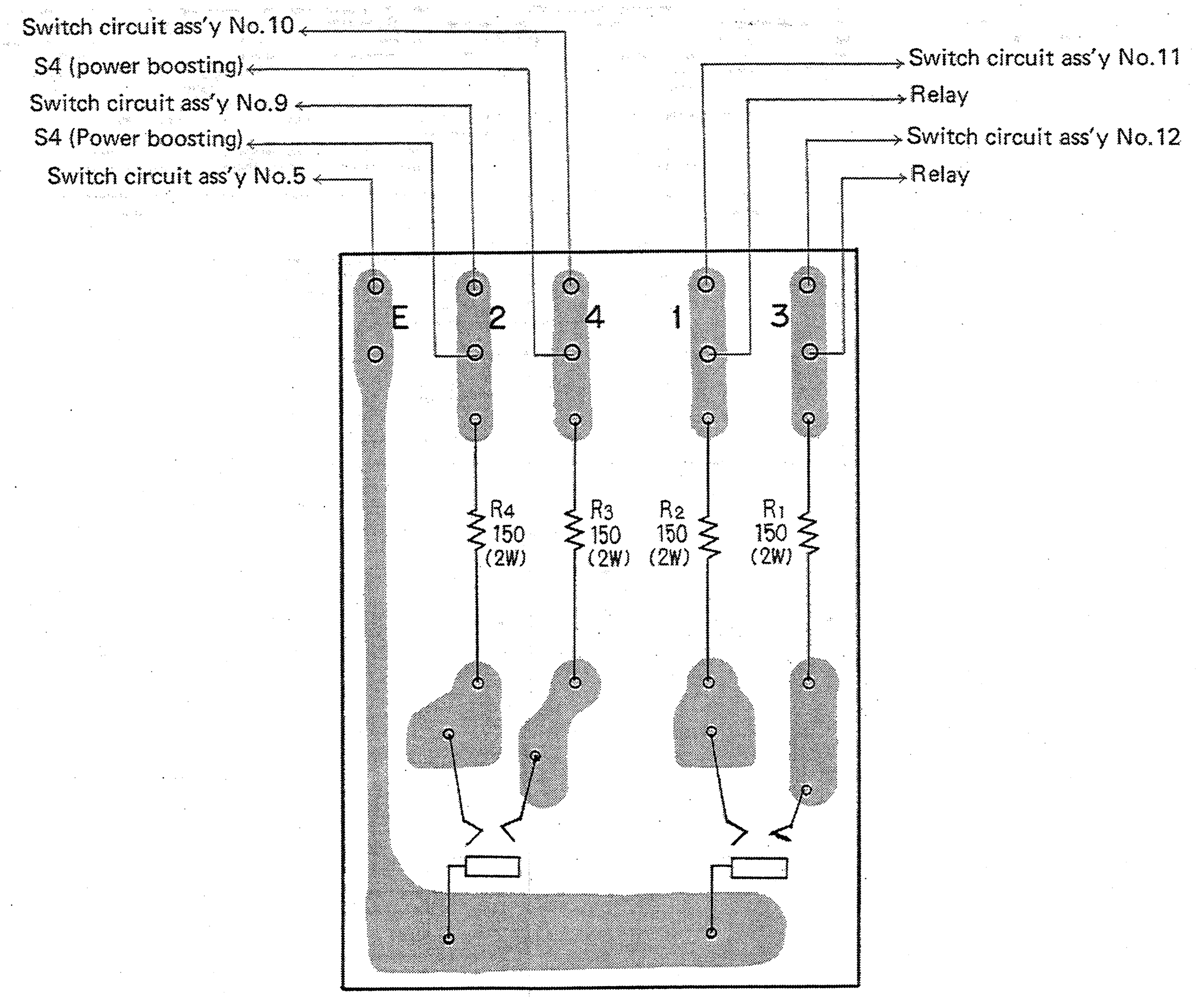
SWITCHES

Symbol	Description	Part No.
S1	Rotary switch (FUNCTION)	ASB-067
S2	Rotary switch (MODE)	ASC-066
S3	Slide switch (DE-EMPHASIS)	ASH-013
S4	Multi-plug (2CH-4CH) Multi-socket (2CH-4CH)	AKM-006 AKP-006
S5	Push switch (POWER)	ASG-070
S6	Relay	ASR-007
S7	Microswitch (switch cover)	ASF-001
S8	Relay	ASR-007

POWER TRANSISTORS (for power amplifier)

Symbol	Description	Part No.
Q109		2SD370-R or O (2SC1403-R or O)
Q110		2SD371S-R or O (2SC1030S-B or C)
Q111		2SD370-R or O (2SC1403-R or O)
Q112		2SD371S-R or O (2SC1030-B or C)
Q113		2SB530-R or O (2SA745-R or O)
Q114		2SB531S-R or O (2SA756S-B or C)
Q115		2SB530-R or O (2SA745-R or O)
Q116		2SB531S-R or O (2SA756S-B or C)

12.2 HEADPHONE JACK ASSEMBLY (AWX-054)


Switch circuit ass'y No.10
S4 (power boosting)
Switch circuit ass'y No.9
S4 (Power boosting)
Switch circuit ass'y No.5
Switch circuit ass'y No.11
Relay
Switch circuit ass'y No.12
Relay
E
2
4
1
3
R4 150 (2W)
R3 150 (2W)
R2 150 (2W)
R1 150 (2W)

Parts List of Headphone Jack Assembly (AWX-054)

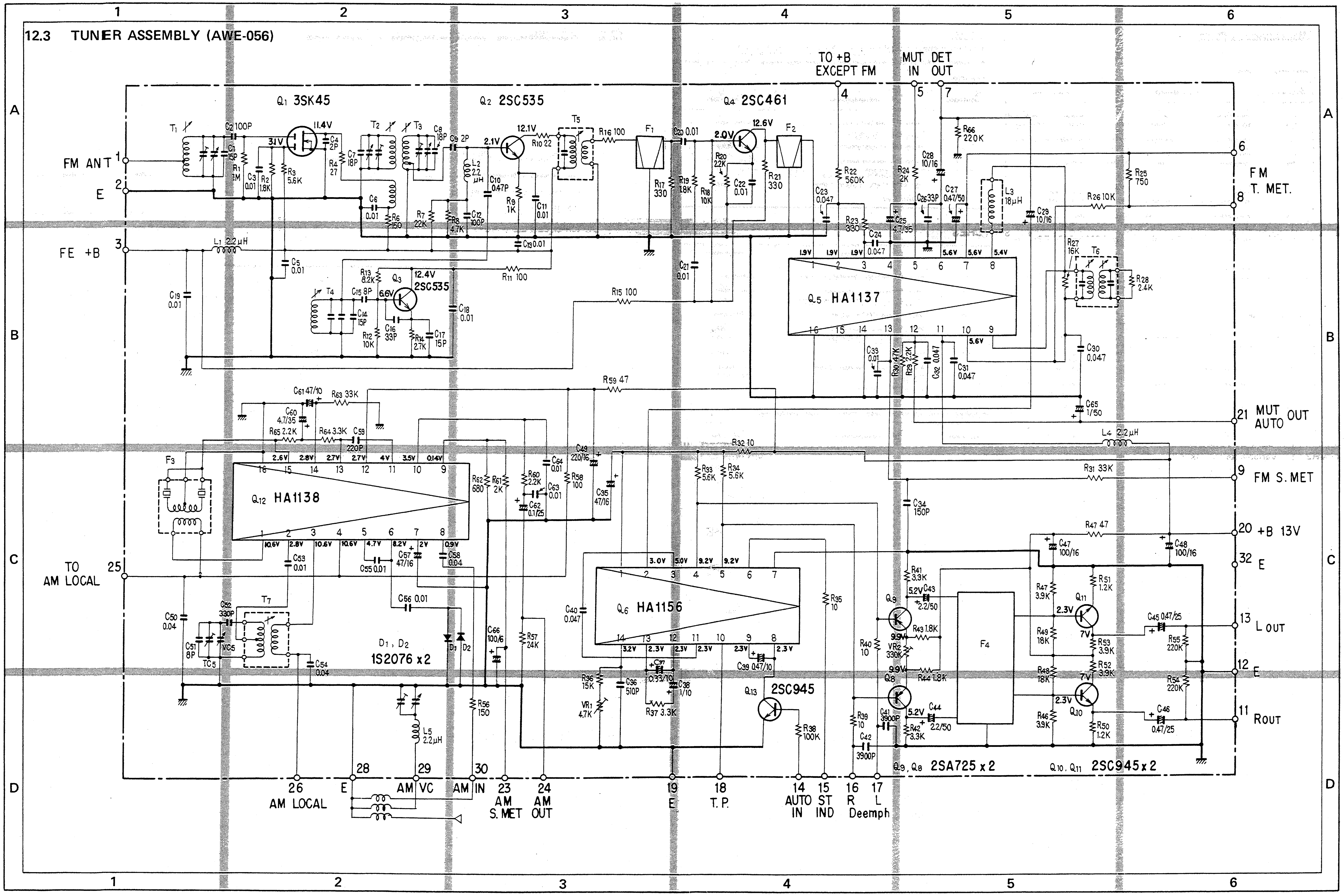
RESISTORS

Symbol	Description			Part No.
R1	Metal oxide	150	2W	RS2P 151K
R2	Metal oxide	150	2W	RS2P 151K
R3	Metal oxide	150	2W	RS2P 151K
R4	Metal oxide	150	2W	RS2P 151K

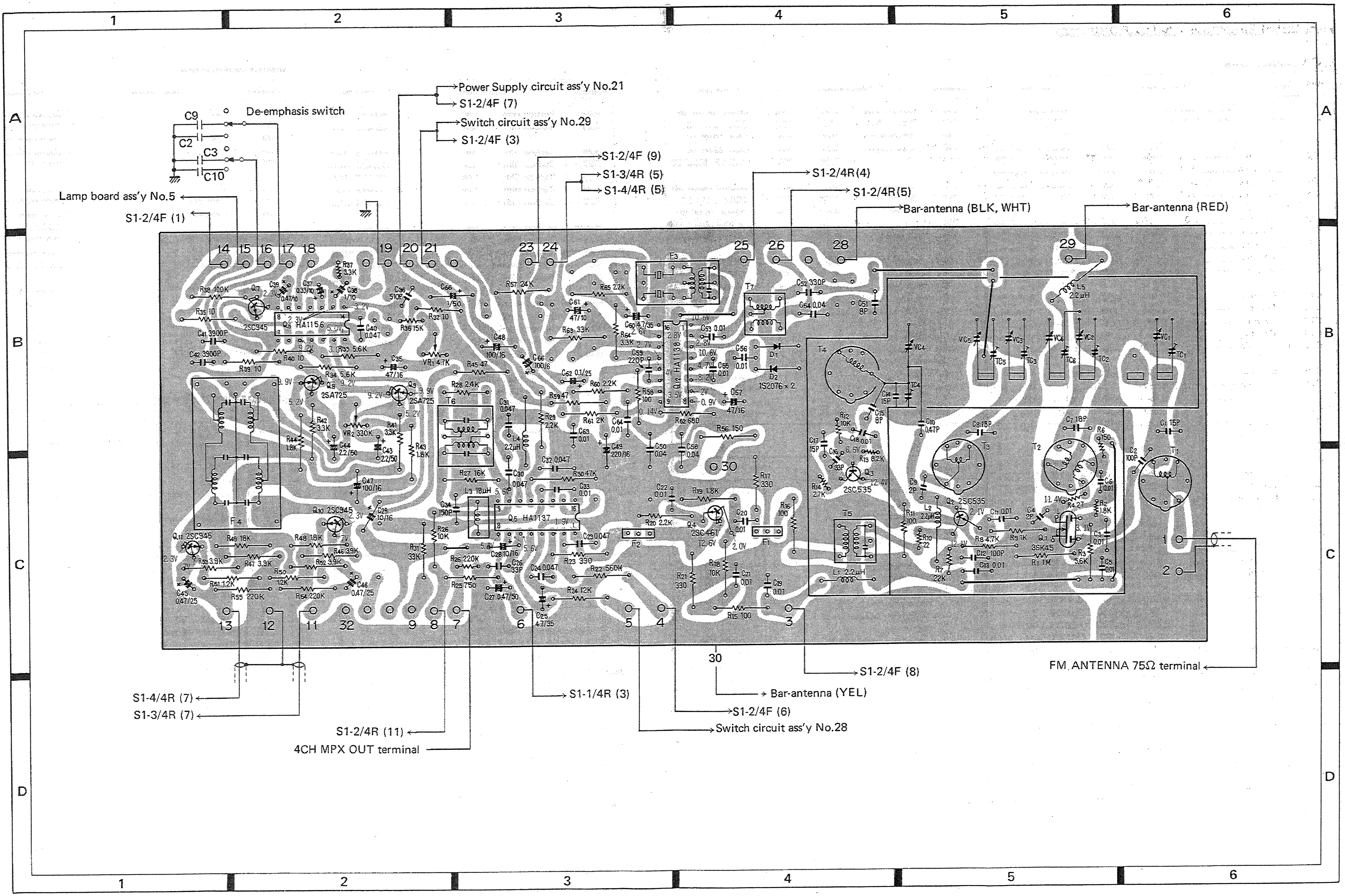
OTHER

Symbol	Description	Part No.
	Phone jack (FRONT)	AKN-002
	Phone jack (REAR)	AKN-002

12.3 TUNER ASSEMBLY (AWE-056)



Q1 3SK45
Q2 2SC535
Q3 2SC535
Q4 2SC461
Q5 HA1137
Q6 HA1156
Q12 HA1138
Q13 2SC945
Q9, Q8 2SA725 x 2
Q10, Q11 2SC945 x 2
D1, D2 1S2076 x 2
T1
T2
T3
T4
T5
T6
T7
F1
F2
F3
F4
L1 2.2μH
L2 2.2μH
L3 18μH
L4 2.2μH
L5 2.2μH
TC5
VC5
VR1 4.7K
VR2 330K
FM ANT 1
E 2
FE +B 3
TO AM LOCAL 25
TO +B EXCEPT FM 4
MUT IN 5
DET OUT 7
FM T. MET. 6 8
MUT AUTO OUT 21
FM S. MET 9
+B 13V 20
E 32
L OUT 13
E 12
R OUT 11
26 AM LOCAL
28 E
29 AM VC
30 AM IN
23 AM S. MET
24 AM OUT
19 E
18 T.P.
14 AUTO IN
15 ST IND
16 R
17 L Deemph
11.4V
3.1V
12.1V
2.1V
12.6V
2.0V
12.4V
6.6V


1
2
3
4
5
6
A
B
C
D
C9
C2
C3
C10
De-emphasis switch
Lamp board ass'y No.5
S1-2/4F (1)
Power Supply circuit ass'y No.21
S1-2/4F (7)
Switch circuit ass'y No.29
S1-2/4F (3)
S1-2/4F (9)
S1-3/4R (5)
S1-4/4R (5)
S1-2/4R(4)
S1-2/4R(5)
Bar-antenna (BLK, WHT)
Bar-antenna (RED)
14
15
16
17
18
19
20
21
23
24
25
26
28
29
30
13
12
11
32
9
8
7
6
5
4
3
1
2
Q5 HA1156
Q5 HA1137
Q12 HA1138
2SC945
2SA725
2SC535
2SC461
3SK45
1S2076 × 2
F3
F4
F1
F2
T1
T2
T3
T4
T5
T6
T7
L3 18μH
L5 2.2μH
L1 2.2μH
S1-4/4R (7)
S1-3/4R (7)
S1-2/4R (11)
4CH MPX OUT terminal
S1-1/4R (3)
Bar-antenna (YEL)
S1-2/4F (6)
Switch circuit ass'y No.28
S1-2/4F (8)
FM ANTENNA 75Ω terminal

Parts List of Tuner Assembly (AWE-056)

CAPACITORS

Symbol	Description	Part No.
VC	Tuning capacitor	ACK-005
TC4	Ceramic trimmer	C43-007
C1	Ceramic 15p 50V	CCDSH 150K 50
C2	Ceramic 100p 50V	CCDSL 101K 50
C3	Ceramic 0.01 50V	CKDYF 103Z 50
C4	Ceramic 2p 50V	CCDSL 020C 50
C5	Ceramic 0.01 50V	CKDYF 103Z 50
C6	Ceramic 0.01 50V	CKDYF 103Z 50
C7	Ceramic 18p 50V	CCDSH 180K 50
C8	Ceramic 18p 50V	CCDSH 180K 50
C9	Ceramic 2p 50V	CCDSL 020C 50
C10	Ceramic 0.47p 500V	CGB R47K 500
C11	Ceramic 0.01 50V	CKDYF 103Z 50
C12	Ceramic 100p 50V	CCDSL 101K 50
C13	Ceramic 0.01 50V	CKDYF 103Z 50
C14	Ceramic 15p 50V	CCDLH 150K 50
C15	Ceramic 8p 50V	CCDCH 080F 50
C16	Ceramic 33p 50V	CCDCH 330K 50
C17	Ceramic 15p 50V	CCDCH 150K 50
C18	Ceramic 0.01 50V	CKDYB 103K 50
C19	Ceramic 0.01 50V	CKDYF 103Z 50
C20	Ceramic 0.01 50V	CKDYF 103Z 50
C21	Ceramic 0.01 50V	CKDYF 103Z 50
C22	Ceramic 0.01 50V	CKDYF 103Z 50
C23	Ceramic 0.047 25V	CKDBC 473Z 25
C24	Ceramic 0.047 25V	CKDBC 473Z 25
C25	Electrolytic 4.7 35V	CEA 4R7P 35
C26	Ceramic 33p 50V	CCDSL 330K 50
C27	Electrolytic 0.47 50V	CEA R47P 50
C28	Electrolytic 10 16V	CEA 100P 16
C29	Electrolytic 10 16V	CEA 100P 16
C30	Ceramic 0.047 25V	CKDBC 473Z 25
C31	Ceramic 0.047 25V	CKDBC 473Z 25
C32	Ceramic 0.047 25V	CKDBC 473Z 25
C33	Ceramic 0.01 50V	CKDYF 103Z 50
C34	Ceramic 150p 50V	CCDSL 151K 50
C35	Electrolytic 47 16V	CEA 470P 16
C36	Styrol 510p 50V	CQSH 511J 50
C37	Electrolytic 0.33 10V	CSSA R33M 10
C38	Electrolytic 1 10V	CSSA 010M 10
C39	Electrolytic 0.47 10V	CSSA R47M 10
C40	Mylar 0.047 50V	CQMA 473K 50
C41	Mylar 0.0039 50V	CQMA 392J 50
C42	Mylar 0.0039 50V	CQMA 392J 50
C43	Electrolytic 2.2 50V	CEA 2R2P 50
C44	Electrolytic 2.2 50V	CEA 2R2P 50
C45	Electrolytic 0.47 25V	CSSA R47M 25
C46	Electrolytic 0.47 25V	CSSA R47M 25
C47	Electrolytic 100 16V	CEA 101P 16
C48	Electrolytic 100 16V	CEA 101P 16
C49	Electrolytic 220 16V	CEA 221P 16
C50	Ceramic 0.04 50V	CKDYF 403Z 50
C51	Ceramic 8p 50V	CCDXL 080F 50
C52	Styrol 330p 50V	CQSA 331J 50
C53	Mylar 0.01 50V	CQMA 103K 50
C54	Ceramic 0.04 50V	CKDYF 403Z 50
C55	Ceramic 0.01 50V	CKDYF 103Z 50
C56	Ceramic 0.01 50V	CKDYF 103Z 50
C57	Electrolytic 47 16V	CEA 470P 16
C58	Ceramic 0.04 50V	CKDYF 403Z 50
C59	Ceramic 220p 50V	CCDSL 221K 50
C60	Electrolytic 4.7 35V	CEA 4R7P 35
C61	Electrolytic 47 10V	CEA 470P 10
C62	Electrolytic 0.1 25V	CSSA 0R1M 25
C63	Ceramic 0.01 50V	CKDYB 103K 50
C64	Ceramic 0.01 50V	CKDYB 103K 50
C65	Electrolytic 1 50V	CEA 010P 50
C66	Electrolytic 100 6V	CEA 101P 6

RESISTORS

Symbol	Description	Part No.
R1	Carbon film 1M	RD¼PS 105J
R2	Carbon film 1.8k	RD¼VS 182J
R3	Carbon film 5.6k	RD¼PS 562J
R4	Carbon film 27	RD¼VS 270J
R5	Vacancy	....
R6	Carbon film 150	RD¼VS 151J
R7	Carbon film 22k	RD¼VS 223J
R8	Carbon film 4.7k	RD¼PS 472J
R9	Carbon film 1k	RD¼PS 102J
R10	Carbon film 22	RD¼VS 220J
R11	Carbon film 100	RD¼PS 101J
R12	Carbon film 10k	RD¼VS 103J
R13	Carbon film 8.2k	RD¼VS 822J
R14	Carbon film 2.7k	RD¼VS 272J
R15	Carbon film 100	RD¼PS 101J
R16	Carbon film 100	RD¼PS 101J
R17	Carbon film 330	RD¼PS 331J
R18	Carbon film 10k	RD¼PS 103J
R19	Carbon film 1.8k	RD¼PS 182J
R20	Carbon film 2.2k	RD¼PS 222J
R21	Carbon film 330	RD¼PS 331J
R22	Carbon film 560k	RD¼PS 564J
R23	Carbon film 330	RD¼PS 331J
R24	Carbon film 12k	RD¼PS 123J
R25	Carbon film 750	RD¼PS 751J
R26	Carbon film 10k	RD¼PS 103J
R27	Carbon film 16k	RD¼PS 163J
R28	Carbon film 2.4k	RD¼VS 242J
R29	Carbon film 2.2k	RD¼PS 222J
R30	Carbon film 47k	RD¼PS 473J
R31	Carbon film 33k	RD¼PS 333J
R32	Carbon film 10	RD¼VS 100J
R33	Carbon film 5.6k	RD¼PS 562J
R34	Carbon film 5.6k	RD¼PS 562J
R35	Carbon film 10	RD¼PS 100J
R36	Carbon film 15k	RD¼VS 153J
R37	Carbon film 3.3k	RD¼VS 332J
R38	Carbon film 100k	RD¼PS 104J
R39	Carbon film 10	RD¼PS 100J
R40	Carbon film 10	RD¼PS 100J
R41	Carbon film 3.3k	RD¼PS 332J
R42	Carbon film 3.3k	RD¼PS 332J
R43	Carbon film 1.8k	RD¼PS 182J
R44	Carbon film 1.8k	RD¼PS 182J
R45	Carbon film 47	RD¼PS 470J
R46	Carbon film 3.9k	RD¼PS 392J
R47	Carbon film 3.9k	RD¼PS 392J
R48	Carbon film 18k	RD¼PS 183J
R49	Carbon film 18k	RD¼PS 183J
R50	Carbon film 1.2k	RD¼PS 122J
R51	Carbon film 1.2k	RD¼PS 122J
R52	Carbon film 3.9k	RD¼PS 392J
R53	Carbon film 3.9k	RD¼PS 392J
R54	Carbon film 220k	RD¼PS 224J
R55	Carbon film 220k	RD¼PS 224J
R56	Carbon film 150	RD¼PS 151J
R57	Carbon film 24k	RD¼PS 243J
R58	Carbon film 100	RD¼PS 101J
R59	Carbon film 47	RD¼PS 470J
R60	Carbon film 2.2k	RD¼PS 222J
R61	Carbon film 2k	RD¼PS 202J
R62	Carbon film 680	RD¼PS 681J
R63	Carbon film 33k	RD¼PS 333J
R64	Carbon film 3.3k	RD¼PS 332J
R65	Carbon film 2.2k	RD¼PS 222J
R66	Carbon film 220k	RD¼PS 224J
VR1	Variable (semi-fixed) 330k-B	C92-051-0
VR2	Variable (semi-fixed) 4.7k-B	ACP-042-0

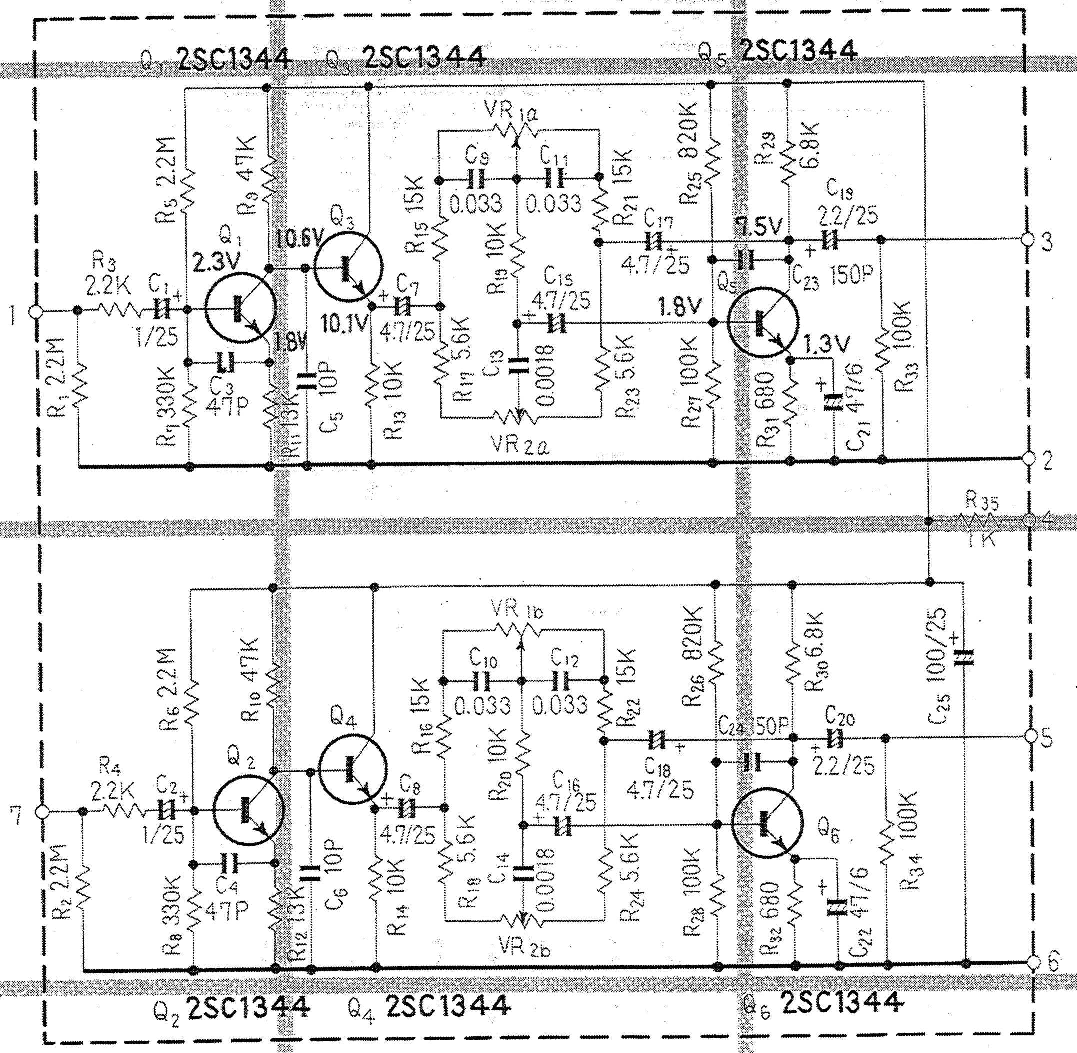
SEMICONDUCTORS

Symbol	Description	Part No.
Q1	FET	3SK45-B
Q2	Transistor	2SC535-B or A
Q3	Transistor	2SC535-B or A
Q4	Transistor	2SC461-B or C
Q5	IC	HA1137
Q6	IC	HA1156
Q7	Transistor	2SC945-Q or R
Q8	Transistor	2SA725-F or G (2SA763P-5 or 6)
Q9	Transistor	2SA725-F or G (2SA763P-5 or 6)
Q10	Transistor	2SC945-Q or R
Q11	Transistor	2SC945-Q or R
Q12	IC	HA1138
D1	Diode	1S2076 (1S2473)
D2	Diode	1S2076 (1S2473)

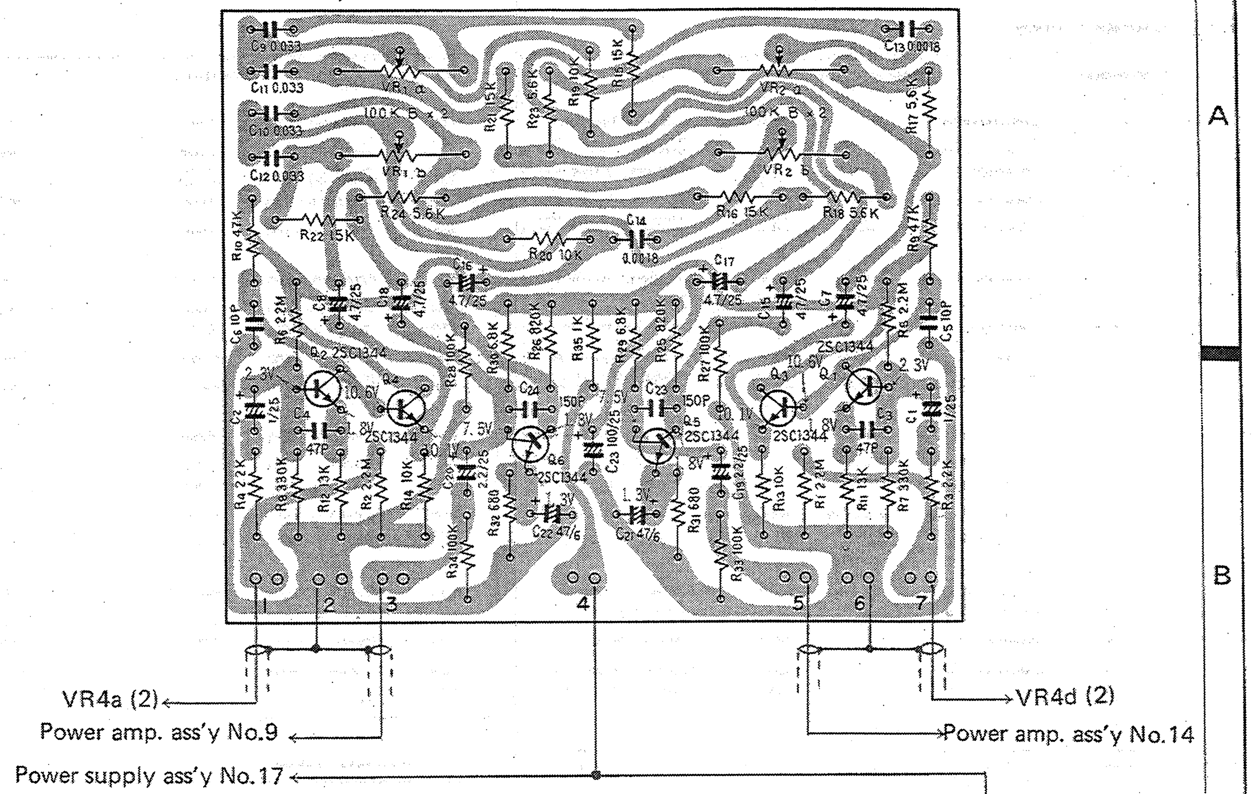
TRANSFORMERS, COILS AND FILTERS

Symbol	Description	Part No.
T1	FM Antenna coil	ATC-021
T2	FM RF coil	ATC-015
T3	FM RF coil	ATC-016
T4	FM OSC coil	ATC-022
T5	FM IF transformer	ATE-008
T6	FM DET transformer	T73-035
T7	AM OSC coil	ATB-013
F1	FM ceramic filter	ATF-013
F2	FM ceramic filter	ATF-013
F3	AM ceramic filter	ATF-009
F4	Low pass filter	ATF-019
L1	RF choke coil 2.2μH	T24-028
L2	RF choke coil 2.2μH	T24-028
L3	RF choke coil 18μH	ATH-007
L4	RF choke coil 2.2μH	T24-028
L5	RF choke coil 2.2μH	T24-028

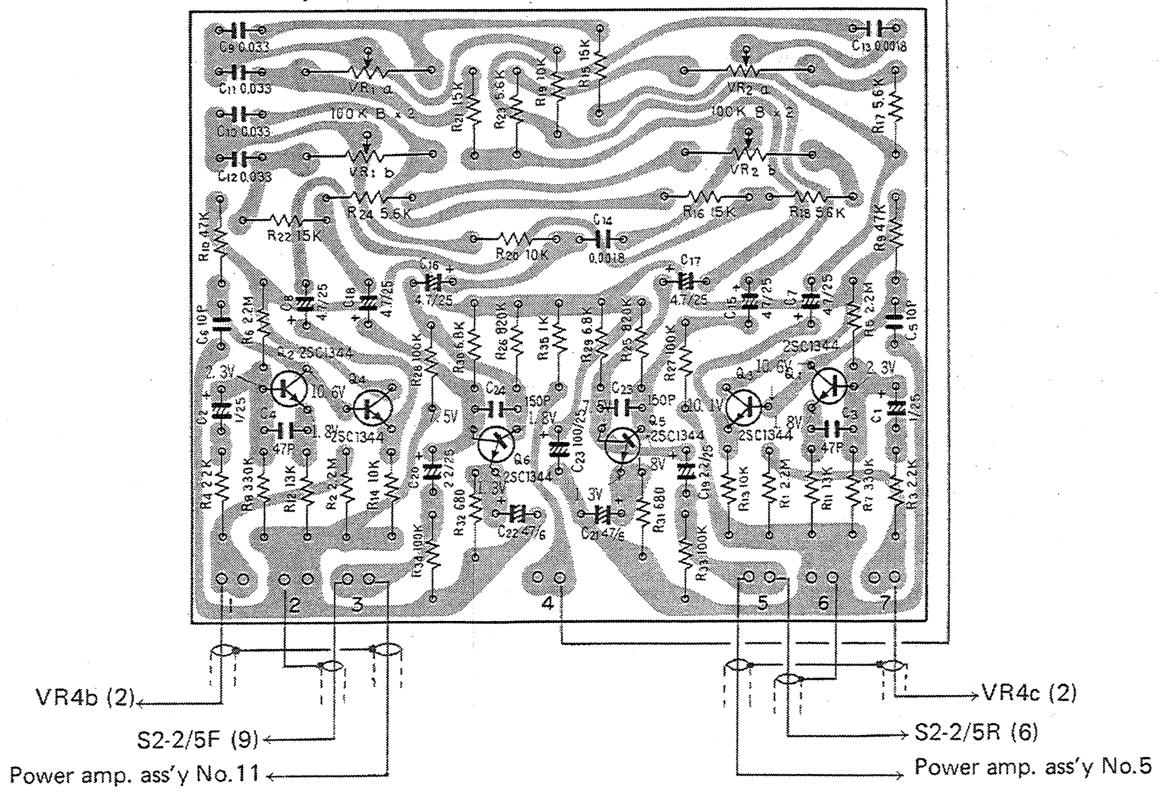
12.4 CONTROL AMPLIFIER ASSEMBLY (AWG-024)


Q1 2SC1344
Q3 2SC1344
Q5 2SC1344
Q2 2SC1344
Q4 2SC1344
Q6 2SC1344
1
2
3
4
5
6
7
R1 2.2M
R2 2.2M
R3 2.2K
R4 2.2K
R5 2.2M
R6 2.2M
R7 330K
R8 330K
R9 47K
R10 47K
R11 13K
R12 13K
R13 10K
R14 10K
R15 15K
R16 15K
R17 5.6K
R18 5.6K
R19 10K
R20 10K
R21 15K
R22 15K
R23 5.6K
R24 5.6K
R25 820K
R26 820K
R27 100K
R28 100K
R29 6.8K
R30 6.8K
R31 680
R32 680
R33 100K
R34 100K
R35 1K
C1 1/25
C2 1/25
C3 47P
C4 47P
C5 10P
C6 10P
C7 4.7/25
C8 4.7/25
C9 0.033
C10 0.033
C11 0.033
C12 0.033
C13 0.0018
C14 0.0018
C15 4.7/25
C16 4.7/25
C17 4.7/25
C18 4.7/25
C19 2.2/25
C20 2.2/25
C21 47/6
C22 47/6
C23 150P
C24 150P
C25 100/25
VR1a
VR1b
VR2a
VR2b
2.3V
10.6V
10.1V
1.8V
7.5V
1.3V

For CH 1, CH 3


VR4a (2)
Power amp. ass'y No.9
Power supply ass'y No.17
VR4d (2)
Power amp. ass'y No.14
1
2
3
4
5
6
7
VR1 a
VR1 b
VR2 a
VR2 b
100K B x 2

For CH2, CH4


VR4b (2)
S2-2/5F (9)
Power amp. ass'y No.11
VR4c (2)
S2-2/5R (6)
Power amp. ass'y No.5
1
2
3
4
5
6
7
VR1 a
VR1 b
VR2 a
VR2 b
100K B x 2

Parts List of Control Amplifier Assembly (AWG-024)

CAPACITORS

Symbol	Description			Part No.
C1	Electrolytic	1	25V	CSSA 010M 25
C2	Electrolytic	1	25V	CSSA 010M 25
C3	Ceramic	47p	50V	CCDSL 470K 50
C4	Ceramic	47p	50V	CCDSL 470K 50
C5	Ceramic	10p	50V	CCDSL 100K 50
C6	Ceramic	10p	50V	CCDSL 100K 50
C7	Electrolytic	4.7	25V	CEA 4R7P 25
C8	Electrolytic	4.7	25V	CEA 4R7P 25
C9	Mylar	0.033	50V	CQMA 333K 50
C10	Mylar	0.033	50V	CQMA 333K 50
C11	Mylar	0.033	50V	CQMA 333K 50
C12	Mylar	0.033	50V	CQMA 333K 50
C13	Mylar	0.0018	50V	CQMA 182K 50
C14	Mylar	0.0018	50V	CQMA 182K 50
C15	Electrolytic	4.7	25V	CEA 4R7P 25
C16	Electrolytic	4.7	25V	CEA 4R7P 25
C17	Electrolytic	4.7	25V	CEA 4R7P 25
C18	Electrolytic	4.7	25V	CSSA 4R7M 25
C19	Electrolytic	2.2	25V	CSSA 2R2M 25
C20	Electrolytic	2.2	25V	CSSA 2R2M 25
C21	Electrolytic	47	6V	CEA 470P 6
C22	Electrolytic	47	6V	CEA 470P 6
C23	Ceramic	150p	50V	CCDSL 151K 50
C24	Ceramic	150p	50V	CCDSL 151K 50
C25	Electrolytic	100	25V	CEA 101P 25

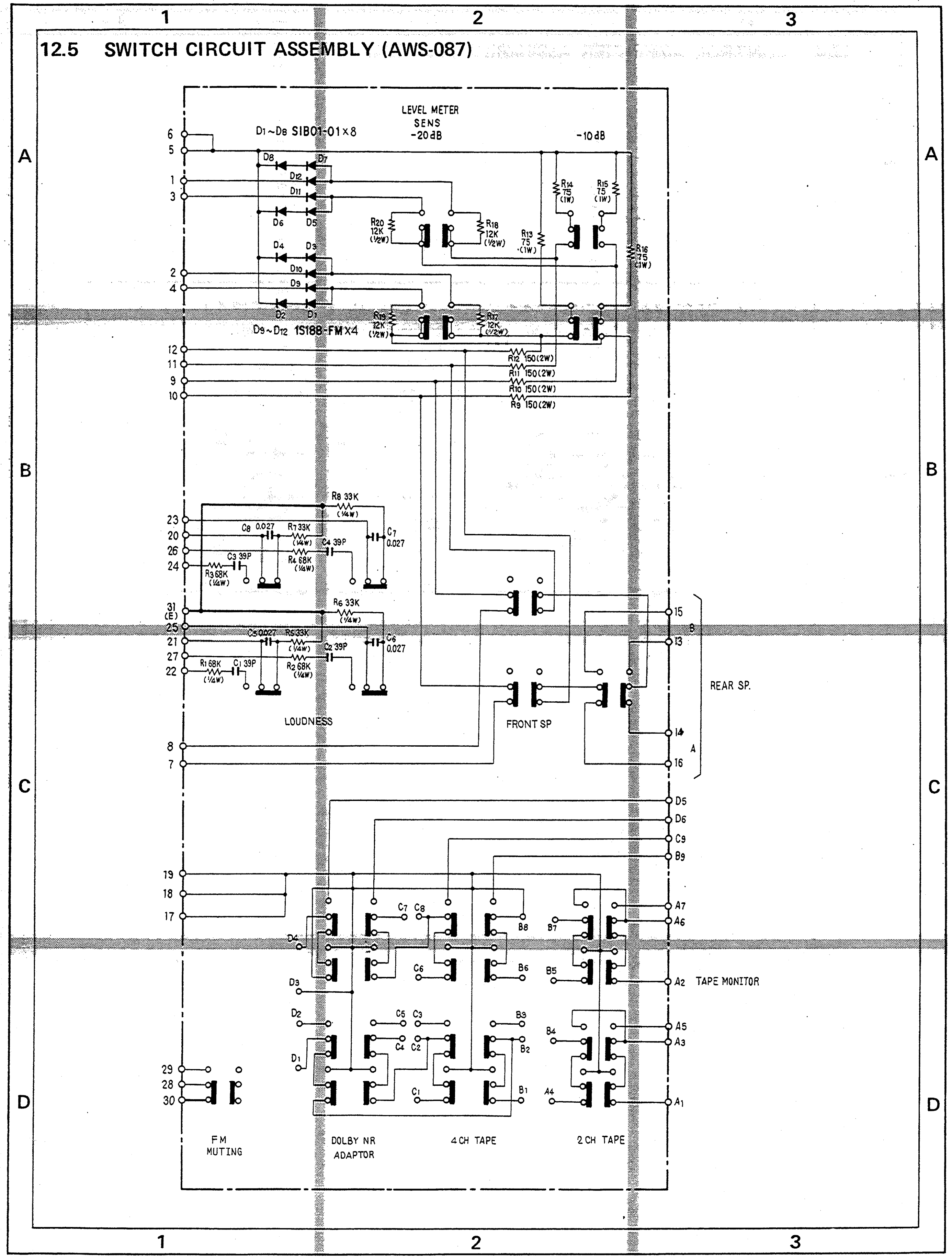
RESISTORS AND POTENTIOMETERS

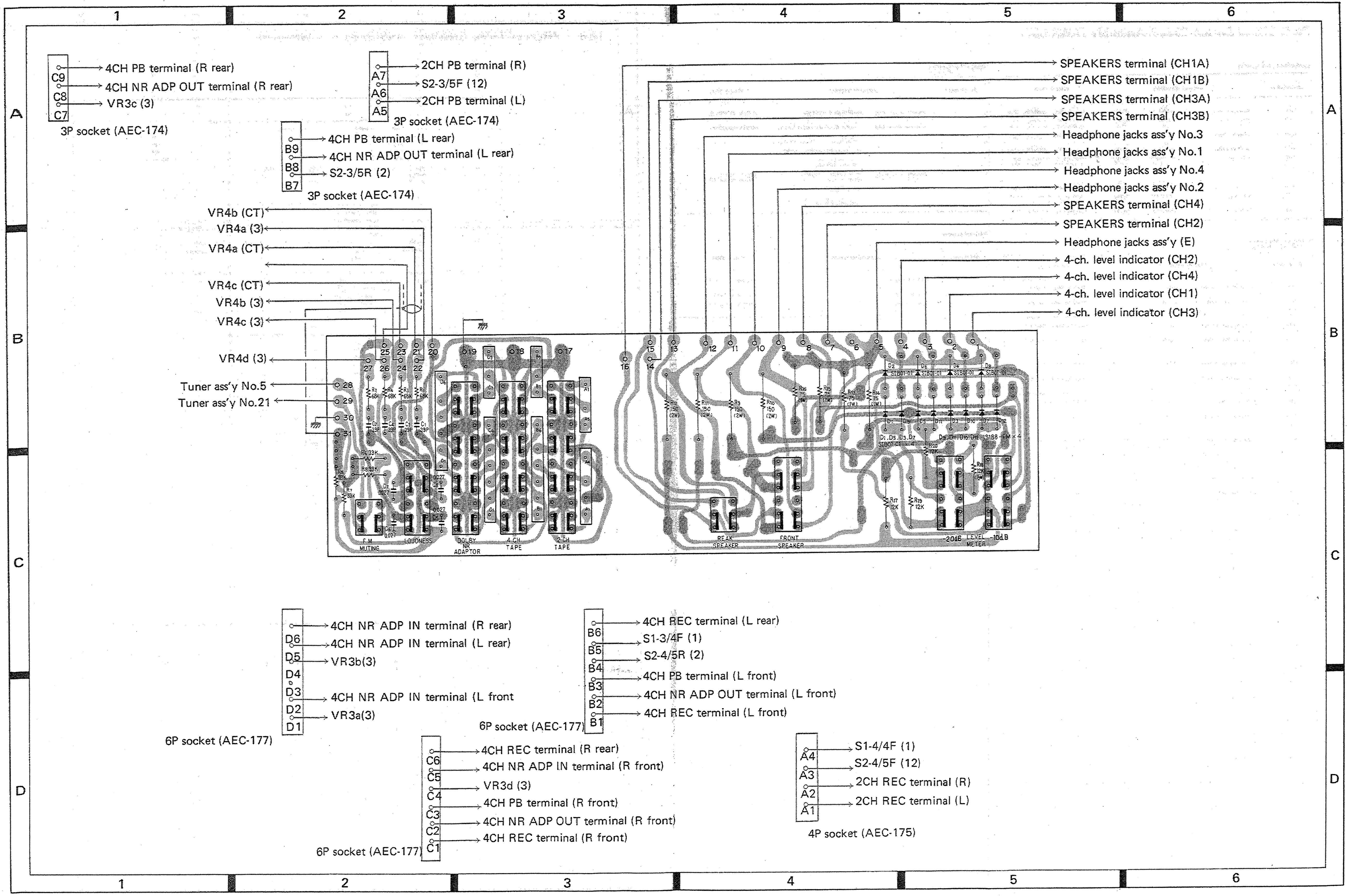
Symbol	Description		Part No.
VR1	Variable resistor	100k-B, dual (BASS)	ACV-110
VR2	Variable resistor	100k-B, dual (TREBLE)	ACV-110
R1	Carbon film	2.2M	RD¼PM 225JNL
R2	Carbon film	2.2M	RD¼PM 225JNL
R3	Carbon film	2.2k	RD¼PM 222J
R4	Carbon film	2.2k	RD¼PM 222J
R5	Carbon film	2.2M	RD¼PM 225JNL
R6	Carbon film	2.2M	RD¼PM 225JNL
R7	Carbon film	330k	RD¼PM 334J
R8	Carbon film	330k	RD¼PM 334J
R9	Carbon film	47k	RD¼PM 473JNL
R10	Carbon film	47k	RD¼PM 473JNL
R11	Carbon film	13k	RD¼PM 133J
R12	Carbon film	13k	RD¼PM 133J
R13	Carbon film	10k	RD¼PM 103J
R14	Carbon film	10k	RD¼PM 103J
R15	Carbon film	15k	RD¼PM 153J
R16	Carbon film	15k	RD¼PM 153J
R17	Carbon film	5.6k	RD¼PM 562J
R18	Carbon film	5.6k	RD¼PM 562J
R19	Carbon film	10k	RD¼PM 103J
R20	Carbon film	10k	RD¼PM 103J
R21	Carbon film	15k	RD¼PM 153J
R22	Carbon film	15k	RD¼PM 153J
R23	Carbon film	5.6k	RD¼PM 562J
R24	Carbon film	5.6k	RD¼PM 562J
R25	Carbon film	820k	RD¼PM 824J
R26	Carbon film	820k	RD¼PM 824J
R27	Carbon film	100k	RD¼PM 104J
R28	Carbon film	100k	RD¼PM 104J
R29	Carbon film	6.8k	RD¼PM 682J
R30	Carbon film	6.8k	RD¼PM 682J
R31	Carbon film	680	RD¼PM 681J
R32	Carbon film	680	RD¼PM 681J
R33	Carbon film	100k	RD¼PM 104J
R34	Carbon film	100k	RD¼PM 104J
R35	Carbon film	1k	RD¼PM 102J

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	Transistor	2SC1344-E or D
Q2	Transistor	2SC1344-E or D
Q3	Transistor	2SC1344-E or D
Q4	Transistor	2SC1344-E or D
Q5	Transistor	2SC1344-E or D
Q6	Transistor 2SC1344-E or D	

12.5 SWITCH CIRCUIT ASSEMBLY (AWS-087)


1
2
3
A
B
C
D
LEVEL METER
SENS
-20dB
-10dB
D1~D8 SIB01-01×8
D9~D12 1S188-FM×4
D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12
R20 12K (½W)
R18 12K (½W)
R19 12K (½W)
R17 12K (½W)
R13 75 (1W)
R14 75 (1W)
R15 75 (1W)
R16 75 (1W)
R12 150(2W)
R11 150(2W)
R10 150(2W)
R9 150(2W)
R8 33K (¼W)
R7 33K (¼W)
R6 33K (¼W)
R5 33K (¼W)
R4 68K (¼W)
R3 68K (¼W)
R2 68K (¼W)
R1 68K (¼W)
C8 0.027
C7 0.027
C6 0.027
C5 0.027
C4 39P
C3 39P
C2 39P
C1 39P
6 5 1 3 2 4 12 11 9 10 23 20 26 24 31 (E) 25 21 27 22 8 7 19 18 17 29 28 30
15 13 14 16
B
A
REAR SP.
LOUDNESS
FRONT SP
D5 D6 C9 B9 A7 A6 A2 A5 A3 A1
C7 C8 B8 B7 C6 B6 B5 C5 C3 B3 B4 C4 C2 B2 C1 B1 A4
D4 D3 D2 D1
TAPE MONITOR
FM MUTING
DOLBY NR ADAPTOR
4CH TAPE
2CH TAPE


1
2
3
4
5
6
A
B
C
D
C9
C8
C7
4CH PB terminal (R rear)
4CH NR ADP OUT terminal (R rear)
VR3c (3)
3P socket (AEC-174)
A7
A6
A5
2CH PB terminal (R)
S2-3/5F (12)
2CH PB terminal (L)
3P socket (AEC-174)
B9
B8
B7
4CH PB terminal (L rear)
4CH NR ADP OUT terminal (L rear)
S2-3/5R (2)
3P socket (AEC-174)
VR4b (CT)
VR4a (3)
VR4a (CT)
VR4c (CT)
VR4b (3)
VR4c (3)
VR4d (3)
Tuner ass'y No.5
Tuner ass'y No.21
SPEAKERS terminal (CH1A)
SPEAKERS terminal (CH1B)
SPEAKERS terminal (CH3A)
SPEAKERS terminal (CH3B)
Headphone jacks ass'y No.3
Headphone jacks ass'y No.1
Headphone jacks ass'y No.4
Headphone jacks ass'y No.2
SPEAKERS terminal (CH4)
SPEAKERS terminal (CH2)
Headphone jacks ass'y (E)
4-ch. level indicator (CH2)
4-ch. level indicator (CH4)
4-ch. level indicator (CH1)
4-ch. level indicator (CH3)
F.M. MUTING
LOUDNESS
DOLBY NR ADAPTOR
4 CH TAPE
2 CH TAPE
REAR SPEAKER
FRONT SPEAKER
-20dB LEVEL METER -10dB
S1B01-01
S1S188-FM×4
D6
D5
D4
D3
D2
D1
4CH NR ADP IN terminal (R rear)
4CH NR ADP IN terminal (L rear)
VR3b(3)
4CH NR ADP IN terminal (L front
VR3a(3)
6P socket (AEC-177)
B6
B5
B4
B3
B2
B1
4CH REC terminal (L rear)
S1-3/4F (1)
S2-4/5R (2)
4CH PB terminal (L front)
4CH NR ADP OUT terminal (L front)
4CH REC terminal (L front)
6P socket (AEC-177)
C6
C5
C4
C3
C2
C1
4CH REC terminal (R rear)
4CH NR ADP IN terminal (R front)
VR3d (3)
4CH PB terminal (R front)
4CH NR ADP OUT terminal (R front)
4CH REC terminal (R front)
6P socket (AEC-177)
A4
A3
A2
A1
S1-4/4F (1)
S2-4/5F (12)
2CH REC terminal (R)
2CH REC terminal (L)
4P socket (AEC-175)

Parts List of Switch Circuit Assembly (AWS-087)

CAPACITORS

Symbol	Description	Part No.
C1	Ceramic 39p 50V	CCDSL 390K 50
C2	Ceramic 39p 50V	CCDSL 390K 50
C3	Ceramic 39p 50V	CCDSL 390K 50
C4	Ceramic 39p 50V	CCDSL 390K 50
C5	Mylar 0.027 50V	CQMA 273K 50
C6	Mylar 0.027 50V	CQMA 273K 50
C7	Mylar 0.027 50V	CQMA 273K 50
C8	Mylar 0.027 50V	CQMA 273K 50

RESISTORS

Symbol	Description	Part No.
R1	Carbon film 68k	RD¼PM 683J
R2	Carbon film 68k	RD¼PM 683J
R3	Carbon film 68k	RD¼PM 683J
R4	Carbon film 68k	RD¼PM 683J
R5	Carbon film 33k	RD¼PM 333J
R6	Carbon film 33k	RD¼PM 333J
R7	Carbon film 33k	RD¼PM 333J
R8	Carbon film 33k	RD¼PM 333J
R9	Metal oxide 150 2W	RS2P 151K
R10	Metal oxide 150 2W	RS2P 151K
R11	Metal oxide 150 2W	RS2P 151K
R12	Metal oxide 150 2W	RS2P 151K
R13	Metal oxide 75 1W	RS1P 750K
R14	Metal oxide 75 1W	RS1P 750K
R15	Metal oxide 75 1W	RS1P 750K
R16	Metal oxide 75 1W	RS1P 750K
R17	Carbon film 12k ½W	RD½PS 123J
R18	Carbon film 12k ½W	RD½PS 123J
R19	Carbon film 12k ½W	RD½PS 123J
R20	Carbon film 12k ½W	RD½PS 123J

SEMICONDUCTORS

Symbol	Description	Part No.
D1	Diode	SIB01-01
D2	Diode	SIB01-01
D3	Diode	SIB01-01
D4	Diode	SIB01-01
D5	Diode	SIB01-01
D6	Diode	SIB01-01
D7	Diode	SIB01-01
D8	Diode	SIB01-01
D9	Diode	1S188FM-1
D10	Diode	1S188FM-1

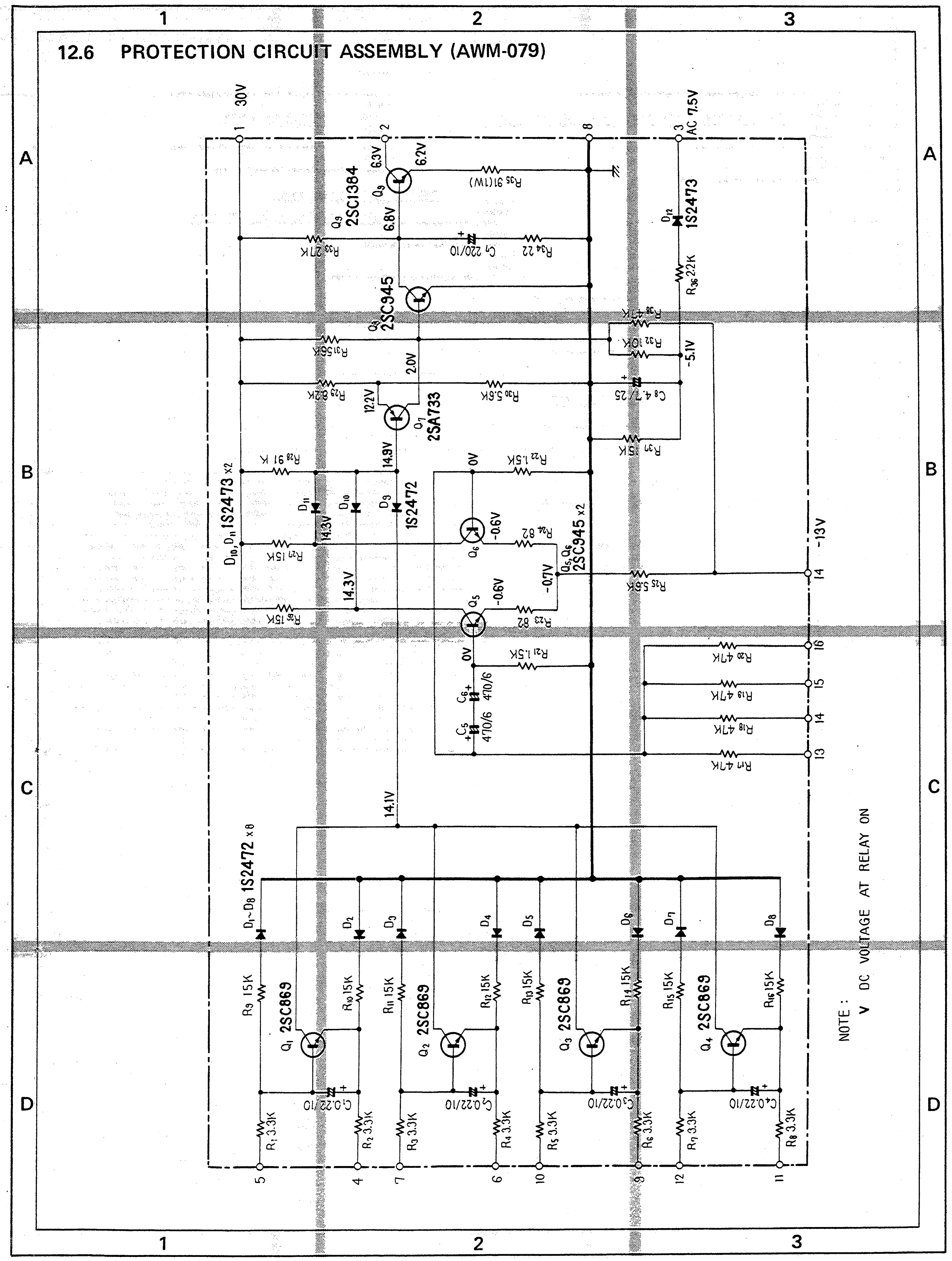
SWITCHES

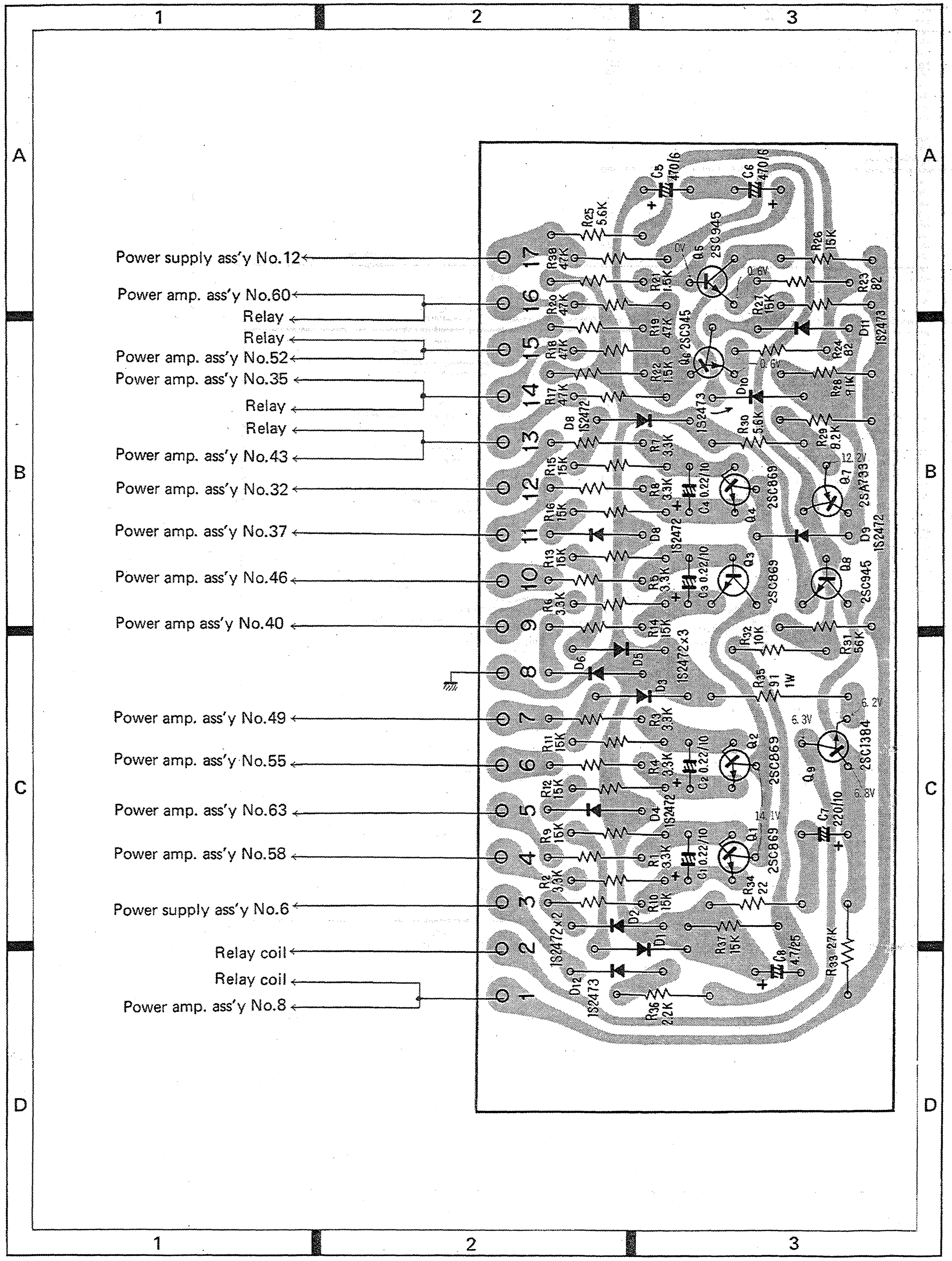
Symbol	Description	Part No.
	Push switch (SPEAKERS)	ASG-078-A
	Push switch (TAPE MONITOR, DOLBY NR ADP., LOUDNESS, FM MUTING)	ASG-079-A
	Push switch (LEVEL INDICATOR SENSITIVITY)	ASG-080-A

OTHERS

Symbol	Description	Part No.
	3p plug	AKM-017-0
	4p plug	AKM-013-0
	6p plug	AKM-015-0

12.6 PROTECTION CIRCUIT ASSEMBLY (AWM-079)


1
2
3
A
B
C
D
30V
AC 7.5V
Q9 2SC1384
6.3V
6.2V
6.8V
R35 91(1W)
R33 27K
C7 220/10
R34 22
D12 1S2473
R36 2.2K
Q8 2SC945
R38 4.7K
R32 10K
-5.1V
R31 56K
2.0V
R29 8.2K
R30 5.6K
C8 4.7/25
12.2V
Q7 2SA733
R37 15K
R28 91 K
14.9V
0V
R22 1.5K
D10, D11 1S2473 x2
D11
D10
D3
1S2472
14.3V
Q6
-0.6V
R24 82
Q5, Q6 2SC945 x2
R27 15K
-0.7V
R25 5.6K
-13V
14.3V
R26 15K
Q5
-0.6V
R23 82
0V
R21 1.5K
C6 470/6
C5 470/6
R20 47K
R19 47K
R18 47K
R17 47K
14.1V
D1~D8 1S2472 x8
D2
D3
D4
D5
D6
D7
D8
R9 15K
R10 15K
R11 15K
R12 15K
R13 15K
R14 15K
R15 15K
R16 15K
Q1 2SC869
Q2 2SC869
Q3 2SC869
Q4 2SC869
C1 0.22/10
C2 0.22/10
C3 0.22/10
C4 0.22/10
R1 3.3K
R2 3.3K
R3 3.3K
R4 3.3K
R5 3.3K
R6 3.3K
R7 3.3K
R8 3.3K
1
2
8
3
14
16
15
14
13
5
4
7
6
10
9
12
11
NOTE :
V DC VOLTAGE AT RELAY ON


1
2
3
A
B
C
D
Power supply ass'y No.12
Power amp. ass'y No.60
Relay
Relay
Power amp. ass'y No.52
Power amp. ass'y No.35
Relay
Relay
Power amp. ass'y No.43
Power amp. ass'y No.32
Power amp. ass'y No.37
Power amp. ass'y No.46
Power amp ass'y No.40
Power amp. ass'y No.49
Power amp. ass'y No.55
Power amp. ass'y No.63
Power amp. ass'y No.58
Power supply ass'y No.6
Relay coil
Relay coil
Power amp. ass'y No.8
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
C5 470/6
C6 470/6
R25 5.6K
R26 15K
R38 47K
R20 47K
R18 47K
R17 47K
R21 1.5K
R19 47K
R22 1.5K
Q5 2SC945
Q6 2SC945
R27 15K
R23 82
R24 82
D11 1S2473
D10 1S2473
R28 91K
R30 5.6K
R29 8.2K
D8 1S2472
R7 3.3K
R15 15K
R16 15K
R8 3.3K
C4 0.22/10
Q4 2SC869
Q7 2SA733
D9 1S2472
R13 15K
R5 3.3K
C3 0.22/10
Q3 2SC869
Q8 2SC945
R6 3.3K
R14 15K
1S2472x3
R32 10K
R31 56K
R35 91 1W
R11 15K
R3 3.3K
R4 3.3K
C2 0.22/10
Q2 2SC869
Q9 2SC1384
R12 15K
D4 1S2472
C7 220/10
R9 15K
R1 3.3K
C1 0.22/10
Q1 2SC869
R2 3.3K
R10 15K
R34 22
D2
D1
1S2472x2
R37 15K
C8 4.7/25
R33 27K
D12 1S2473
R36 2.2K
0.6V
12.2V
6.3V
6.2V
6.8V
14.1V

Parts List of 4ch Protection Circuit Assembly (AWM-079)

CAPACITORS

Symbol	Description			Part No.
C1	Electrolytic	0.22	10V	CSSA R22M 10
C2	Electrolytic	0.22	10V	CSSA R22M 10
C3	Electrolytic	0.22	10V	CSSA R22M 10
C4	Electrolytic	0.22	10V	CSSA R22M 10
C5	Electrolytic	470	6V	CEA 471P 6
C6	Electrolytic	470	6V	CEA 471P 6
C7	Electrolytic	220	10V	CEA 221P 10
C8	Electrolytic	4.7	25V	CEA 4R7P 25

RESISTORS

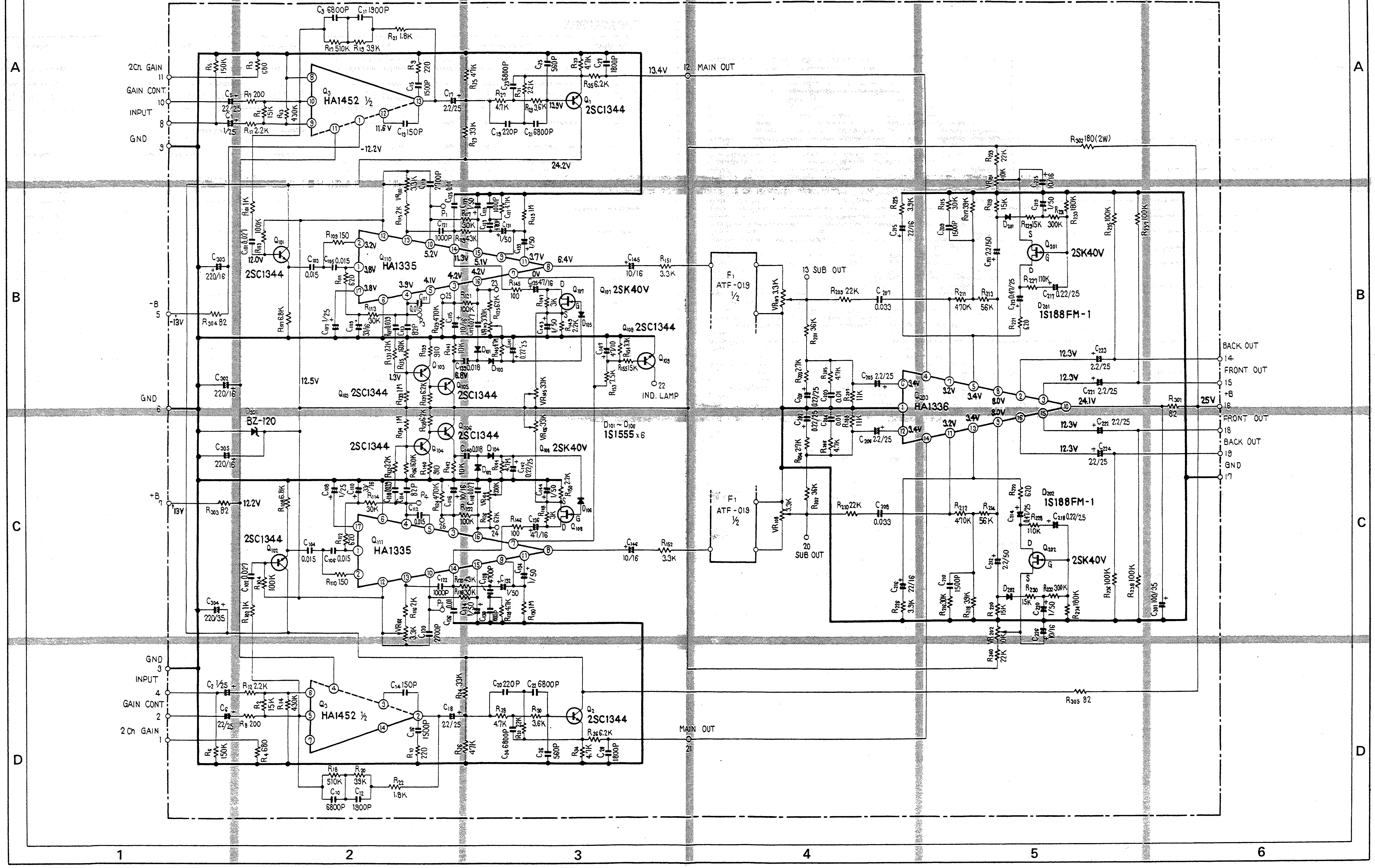
Symbol	Description			Part No.
R1	Carbon film	3.3k		RD¼PM 332J
R2	Carbon film	3.3k		RD¼PM 332J
R3	Carbon film	3.3k		RD¼PM 332J
R4	Carbon film	3.3k		RD¼PM 332J
R5	Carbon film	3.3k		RD¼PM 332J
R6	Carbon film	3.3k		RD¼PM 332J
R7	Carbon film	3.3k		RD¼PM 332J
R8	Carbon film	3.3k		RD¼PM 332J
R9	Carbon film	15k		RD¼PM 153J
R10	Carbon film	15k		RD¼PM 153J
R11	Carbon film	15k		RD¼PM 153J
R12	Carbon film	15k		RD¼PM 153J
R13	Carbon film	15k		RD¼PM 153J
R14	Carbon film	15k		RD¼PM 153J
R15	Carbon film	15k		RD¼PM 153J
R16	Carbon film	15k		RD¼PM 153J
R17	Carbon film	47k		RD¼PM 473J
R18	Carbon film	47k		RD¼PM 473J
R19	Carbon film	47k		RD¼PM 473J
R20	Carbon film	47k		RD¼PM 473J
R21	Carbon film	1.5k		RD¼PM 152J
R22	Carbon film	1.5k		RD¼PM 152J
R23	Carbon film	82		RD¼PM 820J
R24	Carbon film	82		RD¼PM 820J
R25	Carbon film	5.6k		RD¼PM 562J
R26	Carbon film	15k		RD¼PM 153J
R27	Carbon film	15k		RD¼PM 153J
R28	Carbon film	91k		RD¼PM 913J
R29	Carbon film	8.2k		RD¼PM 822J
R30	Carbon film	5.6k		RD¼PM 562J
R31	Carbon film	56k		RD¼PM 563J
R32	Carbon film	10k		RD¼PM 103J
R33	Carbon film	27k		RD¼PM 273J
R34	Carbon film	22		RD¼PM 220J
R35	Metal oxide	91	1W	RS1P 910J

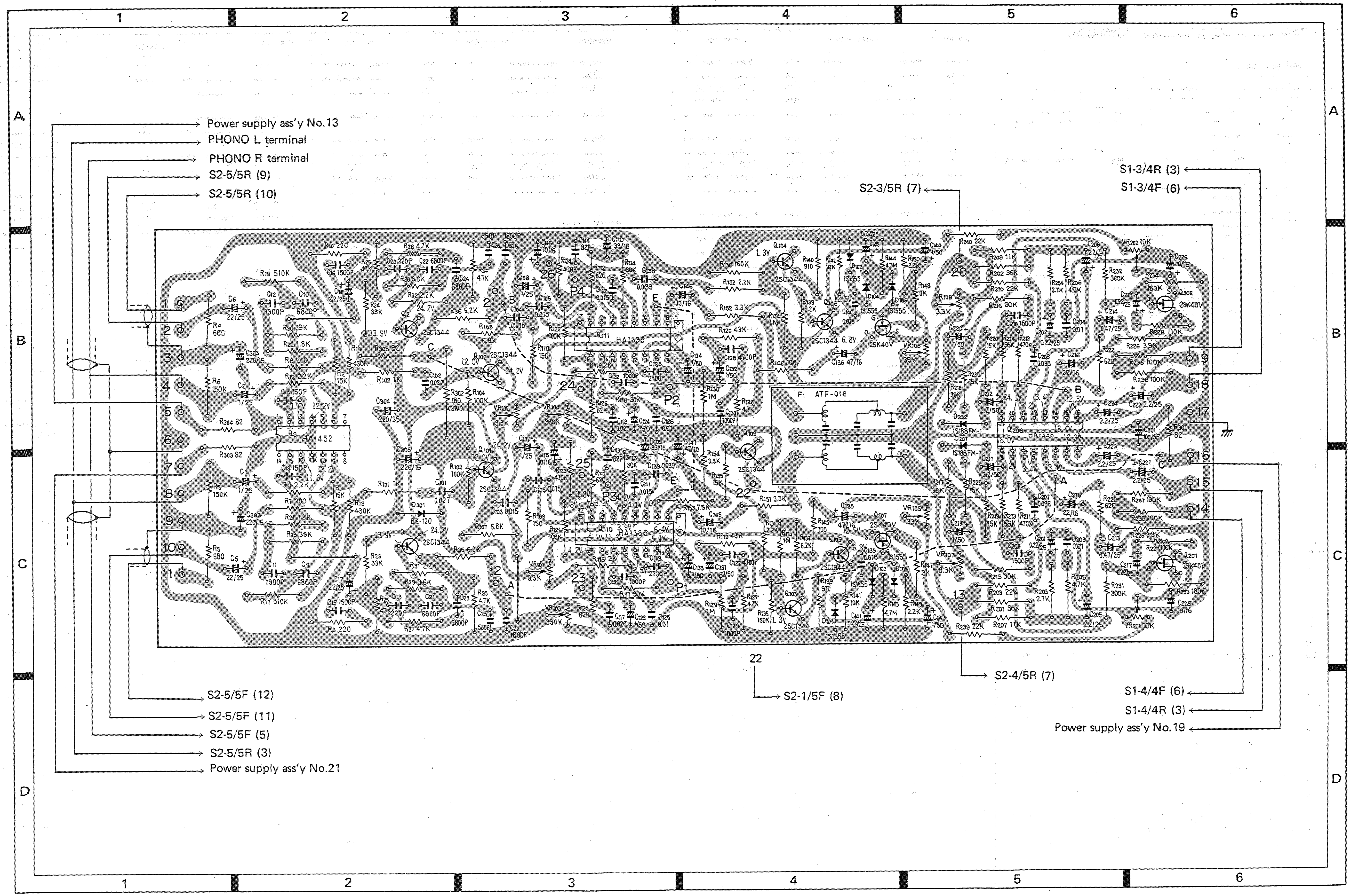
Symbol	Description		Part No.
R36	Carbon film	2.2k	RD¼PM 222J
R37	Carbon film	15k	RD¼PM 153J
R38	Carbon film	47k	RD¼PM 473J

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	Transistor	2SC869-C, B or D (2SC1515K)
Q2	Transistor	2SC869-C, B or D (2SC1515K)
Q3	Transistor	2SC869-C, B or D (2SC1515K)
Q4	Transistor	2SC869-C, B or D (2SC1515K)
Q5	Transistor	2SC945-R or Q
Q6	Transistor	2SC945-R or Q
Q7	Transistor	2SA733-R or Q
Q8	Transistor	2SC945-R or Q
Q9	Transistor	2SC1384-Q or R
D1	Diode	1S2472
D2	Diode	1S2472
D3	Diode	1S2472
D4	Diode	1S2472
D5	Diode	1S2472
D6	Diode	1S2472
D7	Diode	1S2472
D8	Diode	1S2472
D9	Diode	1S2472
D10	Diode	1S2473
D11	Diode	1S2473
D12	Diode	1S2473

12.7 CD-4 ASSEMBLY (AWM-076)


2Ch GAIN
GAIN CONT
INPUT
GND
-B
+B
MAIN OUT
13 SUB OUT
20 SUB OUT
BACK OUT
FRONT OUT
IND. LAMP
Q3 HA1452 ½
Q1 2SC1344
Q2 2SC1344
Q101 2SC1344
Q102 2SC1344
Q103 2SC1344
Q104 2SC1344
Q105 2SC1344
Q106 2SC1344
Q107 2SK40V
Q108 2SK40V
Q109 2SC1344
Q110 HA1335
Q111 HA1335
Q201 2SK40V
Q202 2SK40V
Q203 HA1336
D201 1S188FM-1
D202 1S188FM-1
D101 ~ D106 1S1555 x 6
D301 BZ-120
F1 ATF-019 ½
R302 180(2W)
13.4V
24.2V
-12.2V
12.5V
12.2V
25V
1
2
3
4
5
6
A
B
C
D


Power supply ass'y No.13
PHONO L terminal
PHONO R terminal
S2-5/5R (9)
S2-5/5R (10)
S2-3/5R (7)
S1-3/4R (3)
S1-3/4F (6)
S2-5/5F (12)
S2-5/5F (11)
S2-5/5F (5)
S2-5/5R (3)
Power supply ass'y No.21
S2-1/5F (8)
S2-4/5R (7)
S1-4/4F (6)
S1-4/4R (3)
Power supply ass'y No.19
HA1452
HA1335
HA1336
F1 ATF-016
2SC1344
2SK40V
1
2
3
4
5
6
A
B
C
D

Parts List of CD-4 Assembly (AWM-076)

CAPACITORS

Symbol	Description			Part No.
C1	Electrolytic	1	25V	CSSA 010M 25
C2	Electrolytic	1	25V	CSSA 010M 25
C3	Vacancy			....
C4	Vacancy			....
C5	Electrolytic	22	25V	CEANL 220P 25
C6	Electrolytic	22	25V	CEANL 220P 25
C7	Vacancy			....
C8	Vacancy			....
C9	Styrol	6800p	50V	CQSA 682G 50
C10	Styrol	6800p	50V	CQSA 682G 50
C11	Styrol	1900p	50V	CQSA 192G 50
C12	Styrol	1900p	50V	CQSA 192G 50
C13	Ceramic	150p	50V	CCDSL 151K 50
C14	Ceramic	150p	50V	CCDSL 151K 50
C15	Mylar	0.0015	50V	CQMA 152K 50
C16	Mylar	0.0015	50V	CQMA 152K 50
C17	Electrolytic	2.2	25V	CSSA 2R2M 25
C18	Electrolytic	2.2	25V	CSSA 2R2M 25
C19	Styrol	220p	50V	CQSA 221J 50
C20	Styrol	220p	50V	CQSA 221J 50
C21	Mylar	0.0068	50V	CQMA 682J 50
C22	Mylar	0.0068	50V	CQMA 682J 50
C23	Mylar	0.0068	50V	CQMA 682J 50
C24	Mylar	0.0068	50V	CQMA 682J 50
C25	Ceramic	560p	50V	CKDYB 561K 50
C26	Ceramic	560p	50V	CKDYB 561K 50
C27	Mylar	0.0018	50V	CQMA 182K 50
C28	Mylar	0.0018	50V	CQMA 182K 50
C101	Mylar	0.027	50V	CQMA 273K 50
C102	Mylar	0.027	50V	CQMA 273K 50
C103	Mylar	0.015	50V	CQMA 153K 50
C104	Mylar	0.015	50V	CQMA 153K 50
C105	Mylar	0.015	50V	CQMA 153K 50
C106	Mylar	0.015	50V	CQMA 153K 50
C107	Electrolytic	1	25V	CSSA 010M 25
C108	Electrolytic	1	25V	CSSA 010M 25
C109	Electrolytic	33	16V	CEA 330P 16
C110	Electrolytic	33	16V	CEA 330P 16
C111	Mylar	0.015	50V	CQMA 153K 50
C112	Mylar	0.015	50V	CQMA 153K 50
C113	Ceramic	82p	50V	CCDSL 820K 50
C114	Ceramic	82p	50V	CCDSL 820K 50
C115	Electrolytic	10	16V	CEA 100P 16
C116	Electrolytic	10	16V	CEA 100P 16
C117	Mylar	0.027	50V	CQMA 273K 50
C118	Mylar	0.027	50V	CQMA 273K 50
C119	Mylar	0.0027	50V	CQMA 272K 50
C120	Mylar	0.0027	50V	CQMA 272K 50
C121	Mylar	0.001	50V	CQMA 102K 50
C122	Mylar	0.001	50V	CQMA 102K 50
C123	Electrolytic	1	50V	CEA 010P 50
C124	Electrolytic	1	50V	CEA 010P 50
C125	Mylar	0.01	50V	CQMA 103K 50
C126	Mylar	0.01	50V	CQMA 103K 50
C127	Mylar	0.0047	50V	CQMA 472K 50
C128	Mylar	0.0047	50V	CQMA 472K 50
C129	Mylar	0.001	50V	CQMA 102K 50
C130	Mylar	0.001	50V	CQMA 102K 50
C131	Electrolytic	1	50V	CEA 010P 50
C132	Electrolytic	1	50V	CEA 010P 50
C133	Electrolytic	1	50V	CEA 010P 50
C134	Electrolytic	1	50V	CEA 010P 50
C135	Electrolytic	47	16V	CEA 470P 16
C136	Electrolytic	47	16V	CEA 470P 16
C137	Mylar	0.039	50V	CQMA 393K 50
C138	Mylar	0.039	50V	CQMA 393K 50
C139	Mylar	0.018	50V	CQMA 183K 50
C140	Mylar	0.018	50V	CQMA 183K 50
C141	Electrolytic	0.22	25V	CSSA R22M 25
C142	Electrolytic	0.22	25V	CSSA R22M 25
C143	Electrolytic	1	50V	CEA 010 50
C144	Electrolytic	1	50V	CEA 010 50
C145	Electrolytic	10	16V	CEA 100P 16
C146	Electrolytic	10	16V	CEA 100P 16
C147	Electrolytic	47	10V	CEA 470P 10
C201	Electrolytic	0.22	25V	CSSA R22M 25
C202	Electrolytic	0.22	25V	CSSA R22M 25
C203	Mylar	0.01	50V	CQMA 103K 50
C204	Mylar	0.01	50V	CQMA 103K 50
C205	Electrolytic	2.2	25V	CSSA 2R2M 25
C206	Electrolytic	2.2	25V	CSSA 2R2M 25
C207	Mylar	0.033	50V	CQMA 333K 50
C208	Mylar	0.033	50V	CQMA 333K 50
C209	Mylar	0.0015	50V	CQMA 152K 50
C210	Mylar	0.0015	50V	CQMA 152K 50
C211	Electrolytic	2.2	50V	CEA 2R2P 50
C212	Electrolytic	2.2	50V	CEA 2R2P 50
C213	Electrolytic	0.47	25V	CSSA R47M 25
C214	Electrolytic	0.47	25V	CSSA R47M 25
C215	Electrolytic	22	16V	CEA 220P 16
C216	Electrolytic	22	16V	CEA 220P 16
C217	Electrolytic	0.22	25V	CSSA R22M 25
C218	Electrolytic	0.22	25V	CSSA R22M 25
C219	Electrolytic	1	50V	CSSA 010P 50
C220	Electrolytic	1	50V	CSSA 010P 50
C221	Electrolytic	2.2	25V	CSSA 2R2M 25
C222	Electrolytic	2.2	25V	CSSA 2R2M 25
C223	Electrolytic	2.2	25V	CSSA 2R2M 25
C224	Electrolytic	2.2	25V	CSSA 2R2M 25
C225	Electrolytic	10	16V	CEA 100P 16
C226	Electrolytic	10	16V	CEA 100P 16
C301	Electrolytic	100	35V	CEA 101P 35
C302	Electrolytic	220	16V	CEA 221P 16
C303	Electrolytic	220	16V	CEA 221P 16
C304	Electrolytic	220	35V	CEA 221P 35
C305	Electrolytic	220	16V	CEA 221P 16

RESISTORS

Symbol	Description		Part No.
R1	Carbon film	15k	RD¼PS 153J
R2	Carbon film	15k	RD¼PS 153J
R3	Carbon film	680	RD¼PS 681J
R4	Carbon film	680	RD¼PS 681J
R5	Carbon film	150k	RD¼PS 154J
R6	Carbon film	150k	RD¼PS 154J
R7	Carbon film	200	RD¼PS 201J
R8	Carbon film	200	RD¼PS 201J
R9	Carbon film	220	RD¼PS 221J
R10	Carbon film	220	RD¼PS 221J
R11	Carbon film	2.2k	RD¼PS 222J
R12	Carbon film	2.2k	RD¼PS 222J
R13	Carbon film	430k	RD¼PS 434J
R14	Carbon film	430k	RD¼PS 434J
R15	Vacancy		....
R16	Vacancy		....
R17	Carbon film	510k	RD¼PS 514J
R18	Carbon film	510k	RD¼PS 514J
R19	Carbon film	39k	RD¼PS 393J
R20	Carbon film	39k	RD¼PS 393J
R21	Carbon film	1.8k	RD¼PS 182J
R22	Carbon film	1.8k	RD¼PS 182J
R23	Carbon film	33k	RD¼PS 333J
R24	Carbon film	33k	RD¼PS 333J
R25	Carbon film	47k	RD¼PS 473J
R26	Carbon film	47k	RD¼PS 473J
R27	Carbon film	4.7k	RD¼PS 472J
R28	Carbon film	4.7k	RD¼PS 472J
R29	Carbon film	3.6k	RD¼PS 362J
R30	Carbon film	3.6k	RD¼PS 362J
R31	Carbon film	2.2k	RD¼PS 222J
R32	Carbon film	2.2k	RD¼PS 222J
R33	Carbon film	4.7k	RD¼PS 472J
R34	Carbon film	4.7k	RD¼PS 472J
R35	Carbon film	6.2k	RD¼PS 622J
R36	Carbon film	6.2k	RD¼PS 622J
R101	Carbon film	1k	RD¼PS 102J
R102	Carbon film	1k	RD¼PS 102J
R103	Carbon film	100k	RD¼PS 104J
R104	Carbon film	100k	RD¼PS 104J
R105	Vacancy		....
R106	Vacancy		....
R107	Carbon film	6.8k	RD¼PS 682J
R108	Carbon film	6.8k	RD¼PS 682J
R109	Carbon film	150	RD¼PS 151J
R110	Carbon film	150	RD¼PS 151J
R111	Carbon film	620	RD¼PS 621J
R112	Carbon film	620	RD¼PS 621J
R113	Carbon film	30k	RD¼PS 303J
R114	Carbon film	30k	RD¼PS 303J
R115	Carbon film	2k	RD¼PS 202J
R116	Carbon film	2k	RD¼PS 202J
R117	Carbon film	30k	RD¼PS 303J
R118	Carbon film	30k	RD¼PS 303J
R119	Carbon film	43k	RD¼PS 433J
R120	Carbon film	43k	RD¼PS 433J
R121	Carbon film	100k	RD¼PS 104J
R122	Carbon film	100k	RD¼PS 104J
R123	Carbon film	470k	RD¼PS 474J
R124	Carbon film	470k	RD¼PS 474J
R125	Carbon film	62k	RD¼PS 623J
R126	Carbon film	62k	RD¼PS 623J
R127	Carbon film	4.7k	RD¼PS 472J
R128	Carbon film	4.7k	RD¼PS 472J
R129	Carbon film	1M	RD¼PS 105J
R130	Carbon film	1M	RD¼PS 105J
R131	Carbon film	2.2k	RD¼PS 222J
R132	Carbon film	2.2k	RD¼PS 222J
R133	Carbon film	1M	RD¼PS 105J
R134	Carbon film	1M	RD¼PS 105J
R135	Carbon film	160k	RD¼PS 164J
R136	Carbon film	160k	RD¼PS 164J
R137	Carbon film	6.2k	RD¼PS 622J
R138	Carbon film	6.2k	RD¼PS 622J
R139	Carbon film	910	RD¼PS 911J
R140	Carbon film	910	RD¼PS 911J
R141	Carbon film	10k	RD¼PS 103J
R142	Carbon film	10k	RD¼PS 103J
R143	Carbon film	4.7M	RD¼PS 475J
R144	Carbon film	4.7M	RD¼PS 475J
R145	Carbon film	100	RD¼PS 101J
R146	Carbon film	100	RD¼PS 101J
R147	Carbon film	3k	RD¼PS 302J
R148	Carbon film	3k	RD¼PS 302J
R149	Carbon film	2.2k	RD¼PS 222J
R150	Carbon film	2.2k	RD¼PS 222J
R151	Carbon film	3.3k	RD¼PS 332J
R152	Carbon film	3.3k	RD¼PS 332J
R153	Carbon film	7.5k	RD¼PS 752J
R154	Carbon film	3.3k	RD¼PS 332J

Symbol	Description	Part No.
R155	Carbon film 15k	RD¼PS 153J
R201	Carbon film 36k	RD¼PS 363J
R202	Carbon film 36k	RD¼PS 363J
R203	Carbon film 2.7k	RD¼PS 272J
R204	Carbon film 2.7k	RD¼PS 272J
R205	Carbon film 4.7k	RD¼PS 472J
R206	Carbon film 4.7k	RD¼PS 472J
R207	Carbon film 11k	RD¼PS 113J
R208	Carbon film 11k	RD¼PS 113J
R209	Carbon film 22k	RD¼PS 223J
R210	Carbon film 22k	RD¼PS 223J
R211	Carbon film 470k	RD¼PS 474J
R212	Carbon film 470k	RD¼PS 474J
R213	Carbon film 56k	RD¼PS 563J
R214	Carbon film 56k	RD¼PS 563J
R215	Carbon film 30k	RD¼PS 303J
R216	Carbon film 30k	RD¼PS 303J
R217	Carbon film 39k	RD¼PS 393J
R218	Carbon film 39k	RD¼PS 393J
R219	Carbon film 15k	RD¼PS 153J
R220	Carbon film 15k	RD¼PS 153J
R221	Carbon film 620	RD¼PS 621J
R222	Carbon film 620	RD¼PS 621J
R223	Vacancy	....
R224	Vacancy	....
R225	Carbon film 3.9k	RD¼PS 392J
R226	Carbon film 3.9k	RD¼PS 392J
R227	Carbon film 110k	RD¼PS 114J
R228	Carbon film 110k	RD¼PS 114J
R229	Carbon film 15k	RD¼PS 153J
R230	Carbon film 15k	RD¼PS 153J
R231	Carbon film 300k	RD¼PS 304J
R232	Carbon film 300k	RD¼PS 304J
R233	Carbon film 180k	RD¼PS 184J
R234	Carbon film 180k	RD¼PS 184J
R235	Carbon film 100k	RD¼PS 104J
R236	Carbon film 100k	RD¼PS 104J
R237	Carbon film 100k	RD¼PS 104J
R238	Carbon film 100k	RD¼PS 104J
R239	Carbon film 22k	RD¼PS 223J
R240	Carbon film 22k	RD¼PS 223J
R301	Carbon film 82	RD¼PS 820J
R302	Metal oxide 180 2W	RS2P 181J
R303	Carbon film 82	RD¼PS 820J
R304	Carbon film 82	RD¼PS 820J
R305	Carbon film 82	RD¼PS 820J
VR101	Variable (semi-fixed) 3.3k-B	ACP-047
VR102	Variable (semi-fixed) 3.3k-B	ACP-047
VR103	Variable (semi-fixed) 330k-B	ACP-042
VR104	Variable (semi-fixed) 330k-B	ACP-042
VR105	Variable (semi-fixed) 33k-B	ACP-025

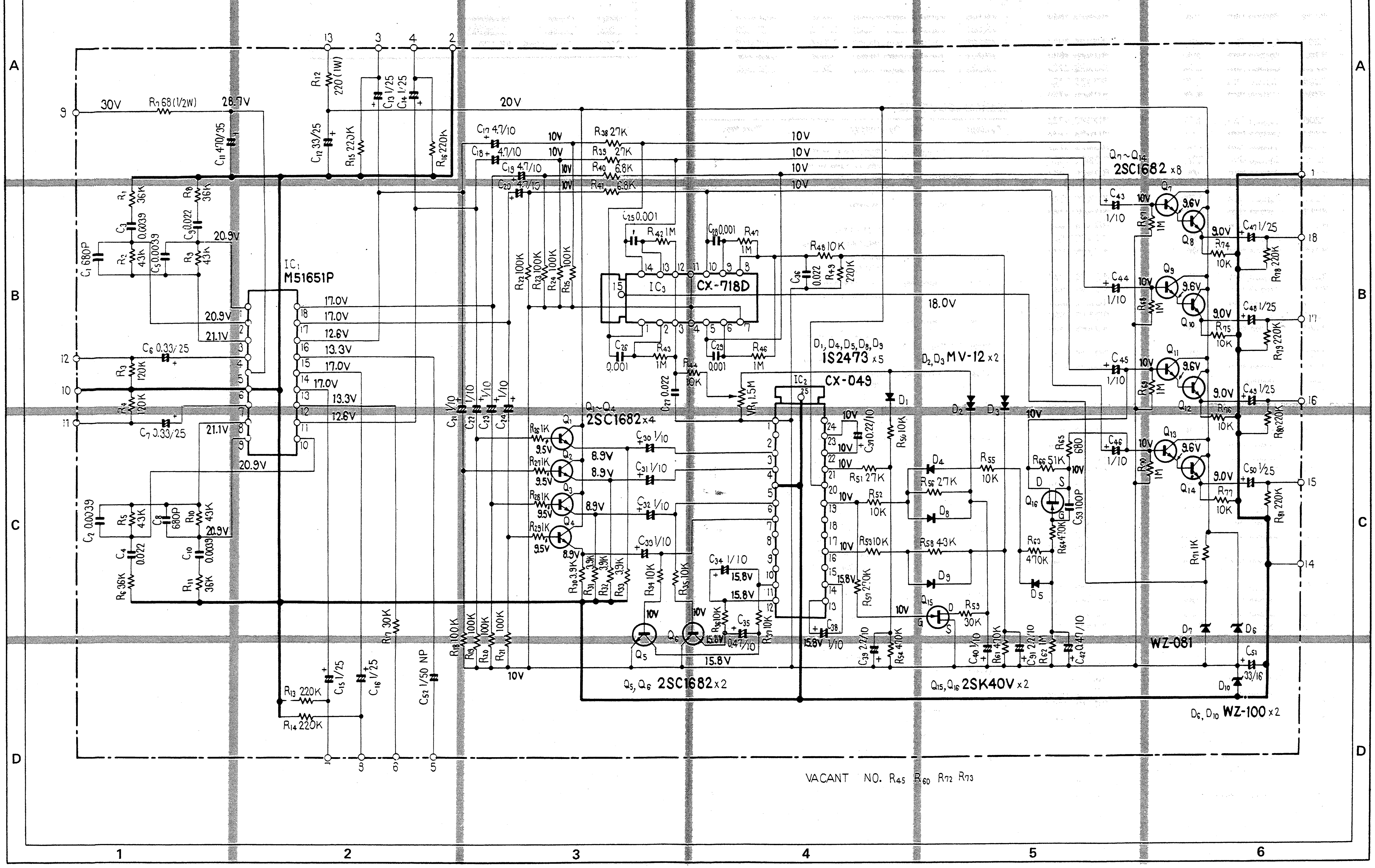
Symbol	Description	Part No.
VR106	Variable (semi-fixed) 33k-B	ACP-025
VR107	Variable (semi-fixed) 3.3k-B	ACP-028
VR108	Variable (semi-fixed) 3.3k-B	ACP-028
VR201	Variable (semi-fixed) 10k-B	C92-049
VR202	Variable (semi-fixed) 10k-B	C92-049

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	Transistor 2SC1344-E or F (2SC1312-G or H)	
Q2	Transistor 2SC1344-E or F (2SC1312-G or H)	
Q3	IC HA1452	
Q101	Transistor 2SC1344-E or F (2SC1312-G or H)	
Q102	Transistor 2SC1344-G or F (2SC1312-G or H)	
Q103	Transistor 2SC1344-E or F (2SC1312-G or H)	
Q104	Transistor 2SC1344-E or F (2SC1312-G or H)	
Q105	Transistor 2SC1344-E or F (2SC1312-G or H)	
Q106	Transistor 2SC1344-E or F (2SC1312-G or H)	
Q107	FET 2SK40V-2 or 3 (2SK30AP-2 or 3)	
Q108	FET 2SK40V-2 or 3 (2SK30AP-2 or 3)	
Q109	Transistor 2SC1344-E or F (2SC1312-G or H)	
Q110	IC HA1335	
Q111	IC HA1335	
Q201	FET 2SK40V-2 or 3 (2SK30AP-2 or 3)	
Q202	FET 2SK40V-2 or 3 (2SK30AP-2 or 3)	
Q203	IC HA1336	
D101	Diode 1S1555 (1S2473)	
D102	Diode 1S1555 (1S2473)	
D103	Diode 1S1555 (1S2473)	
D104	Diode 1S1555 (1S2473)	
D105	Diode 1S1555 (1S2473)	
D106	Diode 1S1555 (1S2473)	

Symbol	Description	Part No.
D201	Diode 1S188FM-1	
D202	Diode 1S188FM-1	
D301	Zener diode BZ-120	

12.8 SQ/RM DECODER ASSEMBLY (AWM-077)


1
2
3
4
5
6
A
B
C
D
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IC₂ CX-049
IC₃ CX-718D
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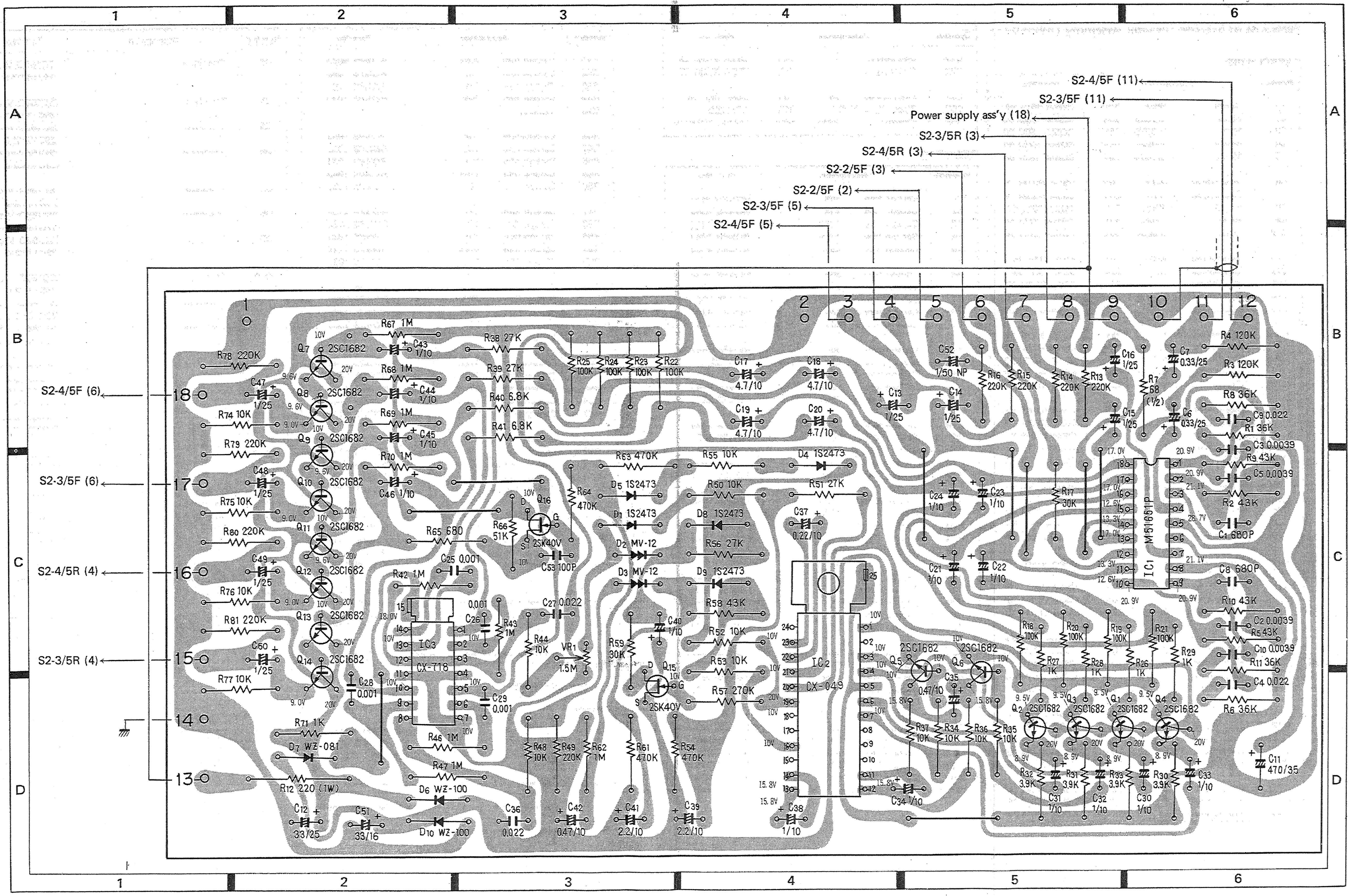
Q₅, Q₆ 2SC1682×2
Q₇~Q₁₄ 2SC1682×8
Q₁₅, Q₁₆ 2SK40V×2
D₁, D₄, D₅, D₈, D₉ 1S2473×5
D₂, D₃ MV-12×2
D₇ WZ-081
D₆, D₁₀ WZ-100×2
VR₁ 1.5M
R₇ 68 (1/2W)
R₁₂ 220 (1W)
C₁₁ 470/35
C₁₂ 33/25
C₁₃ 1/25
C₁₄ 1/25
C₅₂ 1/50 NP
30V
28.7V
20V
20.9V
21.1V
17.0V
12.6V
13.3V
18.0V
15.8V
10V
9.5V
8.9V
9.6V
9.0V

VACANT NO. R₄₅ R₆₀ R₇₂ R₇₃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S2-3/5F (11)
Power supply ass'y (18)
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S2-4/5R (3)
S2-2/5F (3)
S2-2/5F (2)
S2-3/5F (5)
S2-4/5F (5)
S2-4/5F (6)
S2-3/5F (6)
S2-4/5R (4)
S2-3/5R (4)
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10
11
12
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14
15
16
17
18
A
B
C
D
Q7 2SC1682
Q8 2SC1682
Q9 2SC1682
Q10 2SC1682
Q11 2SC1682
Q12 2SC1682
Q13 2SC1682
Q14 2SC1682
Q16 2SK40V
Q15 2SK40V
Q5 2SC1682
Q6 2SC1682
Q2 2SC1682
Q3 2SC1682
Q1 2SC1682
Q4 2SC1682
IC3 CX-718
IC2 CX-049
IC1 M51661P
R78 220K
R74 10K
R79 220K
R75 10K
R80 220K
R76 10K
R81 220K
R77 10K
R67 1M
R68 1M
R69 1M
R70 1M
R38 27K
R39 27K
R40 6.8K
R41 6.8K
R25 100K
R24 100K
R23 100K
R22 100K
R63 470K
R64 470K
R55 10K
R50 10K
R51 27K
R56 27K
R58 43K
R52 10K
R53 10K
R57 270K
R59 30K
R65 680
R66 51K
R42 1M
R43 1M
R44 10K
R46 1M
R47 1M
R48 10K
R49 220K
R62 1M
R61 470K
R54 470K
R71 1K
R12 220 (1W)
R16 220K
R15 220K
R14 220K
R13 220K
R7 68 (1/2)
R17 30K
R4 120K
R3 120K
R8 36K
R1 36K
R9 43K
R2 43K
R10 43K
R5 43K
R11 36K
R6 36K
R18 100K
R20 100K
R19 100K
R21 100K
R27 1K
R28 1K
R26 1K
R29 1K
R37 10K
R34 10K
R36 10K
R35 10K
R32 3.9K
R31 3.9K
R33 3.9K
R30 3.9K
VR1 1.5M
C47 1/25
C48 1/25
C49 1/25
C50 1/25
C43 1/10
C44 1/10
C45 1/10
C46 1/10
C17 4.7/10
C18 4.7/10
C19 4.7/10
C20 4.7/10
C13 1/25
C14 1/25
C52 1/50 NP
C16 1/25
C15 1/25
C7 0.33/25
C6 0.33/25
C9 0.022
C3 0.0039
C5 0.0039
C1 680P
C8 680P
C2 0.0039
C10 0.0039
C4 0.022
C24 1/10
C23 1/10
C21 1/10
C22 1/10
C37 0.22/10
C25 0.001
C53 100P
C26 0.001
C27 0.022
C28 0.001
C29 0.001
C40 1/10
C35 0.47/10
C31 1/10
C32 1/10
C30 1/10
C33 1/10
C34 1/10
C11 470/35
C12 33/25
C51 33/16
C36 0.022
C42 0.47/10
C41 2.2/10
C39 2.2/10
C38 1/10
D4 1S2473
D5 1S2473
D1 1S2473
D8 1S2473
D2 MV-12
D3 MV-12
D9 1S2473
D7 WZ-081
D6 WZ-100
D10 WZ-100
20V
9.6V
9.0V
10V
18.0V
15.8V
17.0V
20.9V
21.1V
28.7V
12.6V
13.3V
9.5V
8.9V

Parts List of SQ/RM Decoder Assembly (AWM-077)

CAPACITORS

Symbol	Description			Part No.
C1	Styrol	680p	50V	CQSA 681J 50
C2	Mylar	0.0039	50V	CQMA 392J 50
C3	Mylar	0.0039	50V	CQMA 392J 50
C4	Mylar	0.022	50V	CQMA 223J 50
C5	Mylar	0.0039	50V	CQMA 392J 50
C6	Electrolytic	0.33	25V	CSSA R33M 25
C7	Electrolytic	0.33	25V	CSSA R33M 25
C8	Styrol	680p	50V	CQSA 681J 50
C9	Mylar	0.022	50V	CQMA 223J 50
C10	Mylar	0.0039	50V	CQMA 392J 50
C11	Electrolytic	470	35V	CEA 471P 35
C12	Electrolytic	33	25V	CEA 330P 25
C13	Electrolytic	1	25V	CSSA 010M 25
C14	Electrolytic	1	25V	CSSA 010M 25
C15	Electrolytic	1	25V	CSSA 010M 25
C16	Electrolytic	1	25V	CSSA 010M 25
C17	Electrolytic	4.7	10V	CSSA 4R7M 10
C18	Electrolytic	4.7	10V	CSSA 4R7M 10
C19	Electrolytic	4.7	10V	CSSA 4R7M 10
C20	Electrolytic	4.7	10V	CSSA 4R7M 10
C21	Electrolytic	1	10V	CSSA 010M 10
C22	Electrolytic	1	10V	CSSA 010M 10
C23	Electrolytic	1	10V	CSSA 010M 10
C24	Electorlytic	1	10V	CSSA 010M 10
C25	Mylar	0.001	50V	CQMA 102J 50
C26	Mylar	0.001	50V	CQMA 102J 50
C27	Mylar	0.022	50V	CQMA 223J 50
C28	Mylar	0.001	50V	CQMA 102J 50
C29	Mylar	0.001	50V	CQMA 102J 50
C30	Electrolytic	1	10V	CSSA 010M 10
C31	Electrolytic	1	10V	CSSA 010M 10
C32	Electrolytic	1	10V	CSSA 010M 10
C33	Electrolytic	1	10V	CSSA 010M 10
C34	Electrolytic	1	10V	CSSA 010M 10
C35	Electrolytic	0.47	10V	CSSA R47M 10
C36	Mylar	0.022	50V	CQMA 223J 50
C37	Electrolytic	0.22	10V	CSSA R22M 10
C38	Electrolytic	1	10V	CSSA 010M 10
C39	Electrolytic	2.2	10V	CSSA 2R2M 10
C40	Electrolytic	1	10V	CSSA 010M 10
C41	Electrolytic	2.2	10V	CSSA 2R2M 10
C42	Electrolytic	0.47	10V	CSSA R47M 10
C43	Electrolytic	1	10V	CSSA 010M 10
C44	Electrolytic	1	10V	CSSA 010M 10
C45	Electrolytic	1	10V	CSSA 010M 10
C46	Electrolytic	1	10V	CSSA 010M 10
C47	Electrolytic	1	25V	CSSA 010M 25
C48	Electrolytic	1	25V	CSSA 010M 25
C49	Electrolytic	1	25V	CSSA 010M 25
C50	Electrolytic	1	25V	CSSA 010M 25
C51	Electrolytic	33	16V	CEA 330P 16
C52	Electrolytic (N.P.)	1	50V	ACH-305
C53	Ceramic	100p	50V	CCDSL 101K 50

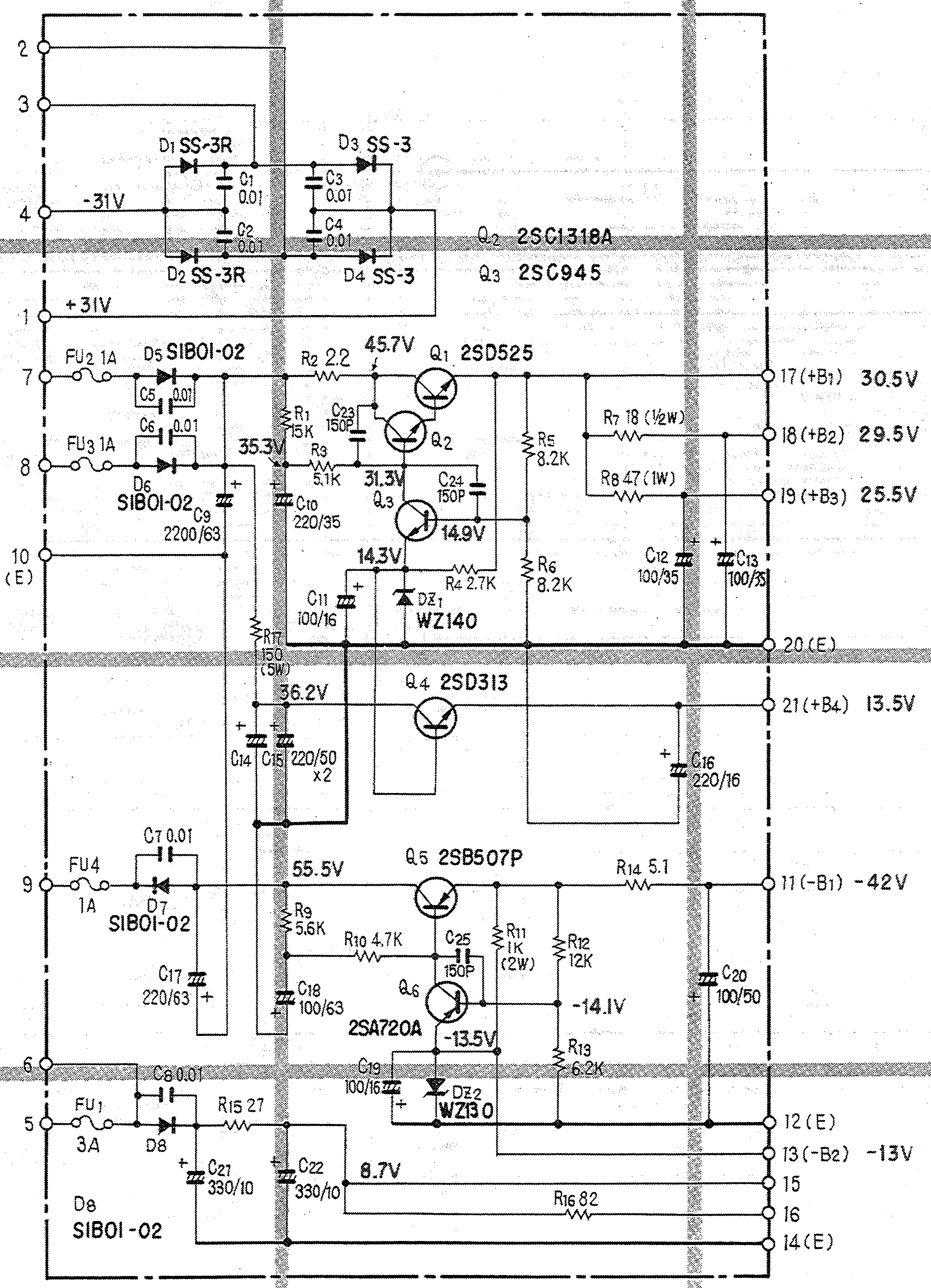
RESISTORS

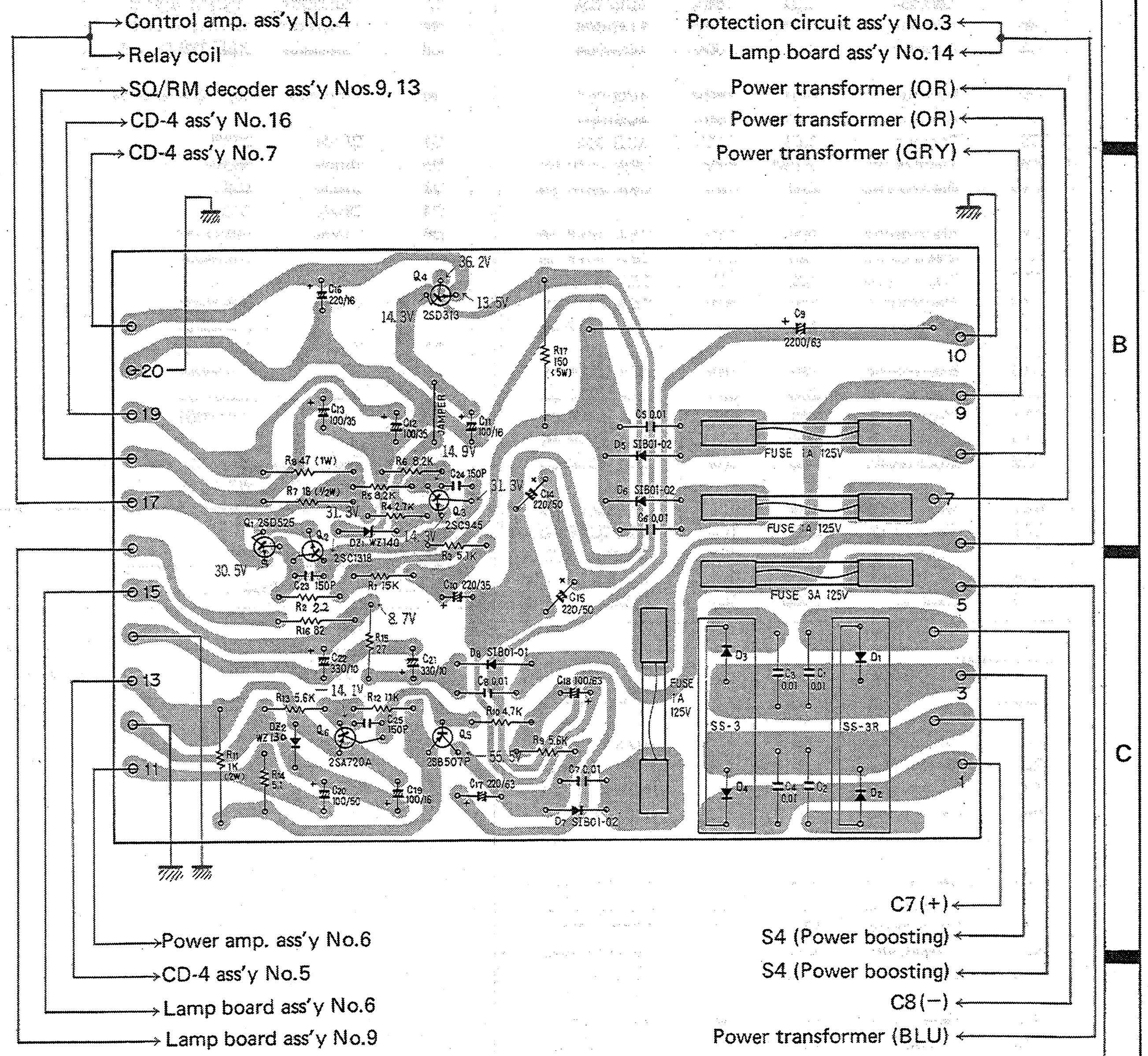
Symbol	Description			Part No.
R1	Carbon film	36k		RD¼PS 363J
R2	Carbon film	43k		RD¼PS 433J
R3	Carbon film	120k		RD¼PS 124J
R4	Carbon film	120k		RD¼PS 124J
R5	Carbon film	43k		RD¼PS 433J
R6	Carbon film	36k		RD¼PS 363J
R7	Carbon film	68	½W	RD½PS 680J
R8	Carbon film	36k		RD¼PS 363J
R9	Carbon film	43k		RD¼PS 433J
R10	Carbon film	43k		RD¼PS 433J
R11	Carbon film	36k		RD¼PS 363J
R12	Metal oxide	220	1W	RS1P 221J
R13	Carbon film	220k		RD¼PS 224J
R14	Carbon film	220k		RD¼PS 224J
R15	Carbon film	220k		RD¼PS 224J
R16	Carbon film	220k		RD¼PS 224J
R17	Carbon film	30k		RD¼PS 303J
R18	Carbon film	100k		RD¼PS 104J
R19	Carbon film	100k		RD¼PS 104J
R20	Carbon film	100k		RD¼PS 104J
R21	Carbon film	100k		RD¼PS 104J
R22	Carbon film	100k		RD¼PS 104J
R23	Carbon film	100k		RD¼PS 104J
R24	Carbon film	100k		RD¼PS 104J
R25	Carbon film	100k		RD¼PS 104J
R26	Carbon film	1k		RD¼PS 102J
R27	Carbon film	1k		RD¼PS 102J
R28	Carbon film	1k		RD¼PS 102J
R29	Carbon film	1k		RD¼PS 102J
R30	Carbon film	3.9k		RD¼PS 392J
R31	Carbon film	3.9k		RD¼PS 392J
R32	Carbon film	3.9k		RD¼PS 392J
R33	Carbon film	3.9k		RD¼PS 392J
R34	Carbon film	10k		RD¼PS 103J
R35	Carbon film	10k		RD¼PS 103J
R36	Carbon film	10k		RD¼PS 103J
R37	Carbon film	10k		RD¼PS 103J
R38	Carbon film	27k		RD¼PS 273J
R39	Carbon film	27k		RD¼PS 273J
R40	Carbon film	6.8k		RD¼PS 682J
R41	Carbon film	6.8k		RD¼PS 682J
R42	Carbon film	1M		RD¼PS 105J
R43	Carbon film	1M		RD¼PS 105J
R44	Carbon film	10k		RD¼PS 103J
R45	Vacancy			....
R46	Carbon film	1M		RD¼PS 105J
R47	Carbon film	1M		RD¼PS 105J
R48	Carbon film	10k		RD¼PS 103J
R49	Carbon film	220k		RD¼PS 224J
R50	Carbon film	10k		RD¼PS 103J
R51	Carbon film	27k		RD¼PS 273J
R52	Carbon film	10k		RD¼PS 103J
R53	Carbon film	10k		RD¼PS 103J
R54	Carbon film	470k		RD¼PS 474J
R55	Carbon film	10k		RD¼PS 103J
R56	Carbon film	27k		RD¼PS 273J
R57	Carbon film	270k		RD¼PS 274J
R58	Carbon film	43k		RD¼PS 433J
R59	Carbon film	30k		RD¼PS 303J
R60	Vacancy			....
R61	Carbon film	470k		RD¼PS 474J
R62	Carbon film	1M		RD¼PS 105J
R63	Carbon film	470k		RD¼PS 474J
R64	Carbon film	470k		RD¼PS 474J
R65	Carbon film	680		RD¼PS 681J
R66	Carbon film	51k		RD¼PS 513J
R67	Carbon film	1M		RD¼PS 105J
R68	Carbon film	1M		RD¼PS 105J
R69	Carbon film	1M		RD¼PS 105J
R70	Carbon film	1M		RD¼PS 105J
R71	Carbon film	1k		RD¼PS 102J
R74	Carbon film	10k		RD¼PS 103J
R75	Carbon film	10k		RD¼PS 103J
R76	Carbon film	10k		RD¼PS 103J
R77	Carbon film	10k		RD¼PS 103J
R78	Carbon film	220k		RD¼PS 224J
R79	Carbon film	220k		RD¼PS 224J
R80	Carbon film	220k		RD¼PS 224J
R81	Carbon film	220k		RD¼PS 224J
VR1	Variable (semi-fixed)	1.5M-B		ACP-048

SEMICONDUCTORS

Symbol	Description	Part No.
IC1	IC	M51651P
IC2	IC	CX-049
IC3	IC	CX-718D
Q1	Transistor	2SC1682-V or BL (2SC1312-G or H)
Q2	Transistor	2SC1682-V or BL (2SC1312-G or H)
Q3	Transistor	2SC1682-V or BL (2SC1312-G or H)
Q4	Transistor	2SC1682-V or BL (2SC1312-G or H)
Q5	Transistor	2SC1682-V or BL (2SC1312-G or H)
Q6	Transistor	2SC1682-V or BL (2SC1312-G or H)
Q7	Transistor	2SC1682-V or BL (2SC1312-G or H)
Q8	Transistor	2SC1682-V or BL (2SC1312-G or H)
Q9	Transistor	2SC1682-V or BL (2SC1312-G or H)
Q10	Transistor	2SC1682-V or BL (2SC1312-G or H)
Q11	Transistor	2SC1682-V or BL (2SC1312-G or H)
Q12	Transistor	2SC1682-V or BL (2SC1312-G or H)
Q13	Transistor	2SC1682-V or BL (2SC1312-G or H)
Q14	Transistor	2SC1682-V or BL (2SC1312-G or H)
Q15	FET	2SK40V-2 or 3 (2SK30AP-2 or 3)
Q16	FET	2SK40V-2 or 3 (2SK30AP-2 or 3)
D1	Diode	1S2473
D2	Varistor	MV-12
D3	Varistor	MV-12
D4	Diode	1S2473
D5	Diode	1S2473
D6	Zener diode	WZ-100
D7	Zener diode	WZ-081
D8	Diode	1S2473
D9	Diode	1S2473
D10	Zener diode	WZ-100

12.9 POWER SUPPLY CIRCUIT ASSEMBLY (AWR-086)


D1 SS-3R
D2 SS-3R
D3 SS-3
D4 SS-3
C1 0.01
C2 0.01
C3 0.01
C4 0.01
-31V
+31V
Q2 2SC1318A
Q3 2SC945
FU2 1A
D5 SIB01-02
C5 0.01
FU3 1A
C6 0.01
D6 SIB01-02
C9 2200/63
R2 2.2
45.7V
Q1 2SD525
R1 15K
C23 150P
R3 5.1K
35.3V
31.3V
C24 150P
C10 220/35
14.3V
14.9V
R4 2.7K
DZ1 WZ140
C11 100/16
R5 8.2K
R6 8.2K
R7 18 (1/2W)
R8 47 (1W)
C12 100/35
C13 100/35
17(+B1) 30.5V
18(+B2) 29.5V
19(+B3) 25.5V
20(E)
R17 150 (5W)
36.2V
Q4 2SD313
C14 C15 220/50 x2
C16 220/16
21(+B4) 13.5V
C7 0.01
FU4 1A
D7 SIB01-02
55.5V
Q5 2SB507P
R14 5.1
11(-B1) -42V
R9 5.6K
R10 4.7K
C25 150P
R11 1K (2W)
R12 12K
C17 220/63
C18 100/63
Q6 2SA720A
-14.1V
-13.5V
C20 100/50
R13 6.2K
C19 100/16
DZ2 WZ130
C8 0.01
FU1 3A
D8
R15 27
C21 330/10
C22 330/10
8.7V
R16 82
D8 SIB01-02
12(E)
13(-B2) -13V
15
16
14(E)
10 (E)
1
2
3
4
5
6
7
8
9


Control amp. ass'y No.4
Relay coil
SQ/RM decoder ass'y Nos.9, 13
CD-4 ass'y No.16
CD-4 ass'y No.7
Protection circuit ass'y No.3
Lamp board ass'y No.14
Power transformer (OR)
Power transformer (OR)
Power transformer (GRY)
20
19
17
15
13
11
10
9
7
5
3
1
FUSE 2A 125V
FUSE 1A 125V
FUSE 3A 125V
FUSE 1A 125V
SS-3
SS-3R
Q4 2SD313
Q1 2SD525
Q2 2SC1318
Q3 2SC945
Q6 2SA720A
Q5 2SB507P
JAMPER
36.2V
13.5V
14.3V
30.5V
31.3V
8.7V
14.1V
55.5V
Power amp. ass'y No.6
CD-4 ass'y No.5
Lamp board ass'y No.6
Lamp board ass'y No.9
C7(+)
S4 (Power boosting)
S4 (Power boosting)
C8(−)
Power transformer (BLU)

Parts List of Power Supply Circuit Assembly (AWR-086)

CAPACITORS

Symbol	Description	Part No.
C1	Ceramic 0.01 150V	ACG-004
C2	Ceramic 0.01 150V	ACG-004
C3	Ceramic 0.01 150V	ACG-004
C4	Ceramic 0.01 150V	ACG-004
C5	Ceramic 0.01 150V	ACG-004
C6	Ceramic 0.01 150V	ACG-004
C7	Ceramic 0.01 150V	ACG-004
C8	Ceramic 0.01 150V	ACG-004
C9	Electrolytic 2,200 63V	CEB 222P 63
C10	Electrolytic 220 35V	CEA 221P 35
C11	Electrolytic 100 16V	CEA 101P 16
C12	Electrolytic 100 35V	CEA 101P 35
C13	Electrolytic 100 35V	CEA 101P 35
C14	Electrolytic 220 50V	CEA 221P 50
C15	Electrolytic 220 50V	CEA 221P 50
C16	Electrolytic 220 16V	CEA 221P 16
C17	Electrolytic 220 63V	CEA 221P 63
C18	Electrolytic 100 63V	CEA 101P 63
C19	Electrolytic 100 16V	CEA 101P 16
C20	Electrolytic 100 50V	CEA 101P 50
C21	Electrolytic 330 10V	CEA 331P 10
C22	Electrolytic 330 10V	CEA 331P 10
C23	Ceramic 150p 50V	CCDSL 151Z 50
C24	Ceramic 150p 50V	CCDSL 151Z 50
C25	Ceramic 150p 50V	CCDSL 151Z 50

RESISTORS

Symbol	Description	Part No.
R1	Carbon film 15k	RD¼PM 153J
R2	Carbon film 2.2	RD¼PM 2R2J
R3	Carbon film 5.1k	RD¼PM 512J
R4	Carbon film 2.7k	RD¼PM 272J
R5	Carbon film 9.1k	RD¼PM 912J
R6	Carbon film 8.2k	RD¼PM 822J
R7	Carbon film 18 ½W	RD½PS 180J
R8	Metal oxide 47 1W	RS1P 470K
R9	Carbon film 5.6k	RD¼PM 562J
R10	Carbon film 4.7k	RD¼PM 472J
R11	Metal oxide 1k 2W	RS2P 102K
R12	Carbon film 12k	RD¼PM 123J
R13	Carbon film 5.6k	RD¼PM 562J
R14	Carbon film 5.1	RD¼PM 5R1J
R15	Carbon film 27	RD¼PM 270J
R16	Carbon film 82	RD¼PM 820J
R17	Wire wound 150 5W	RT5B 151K

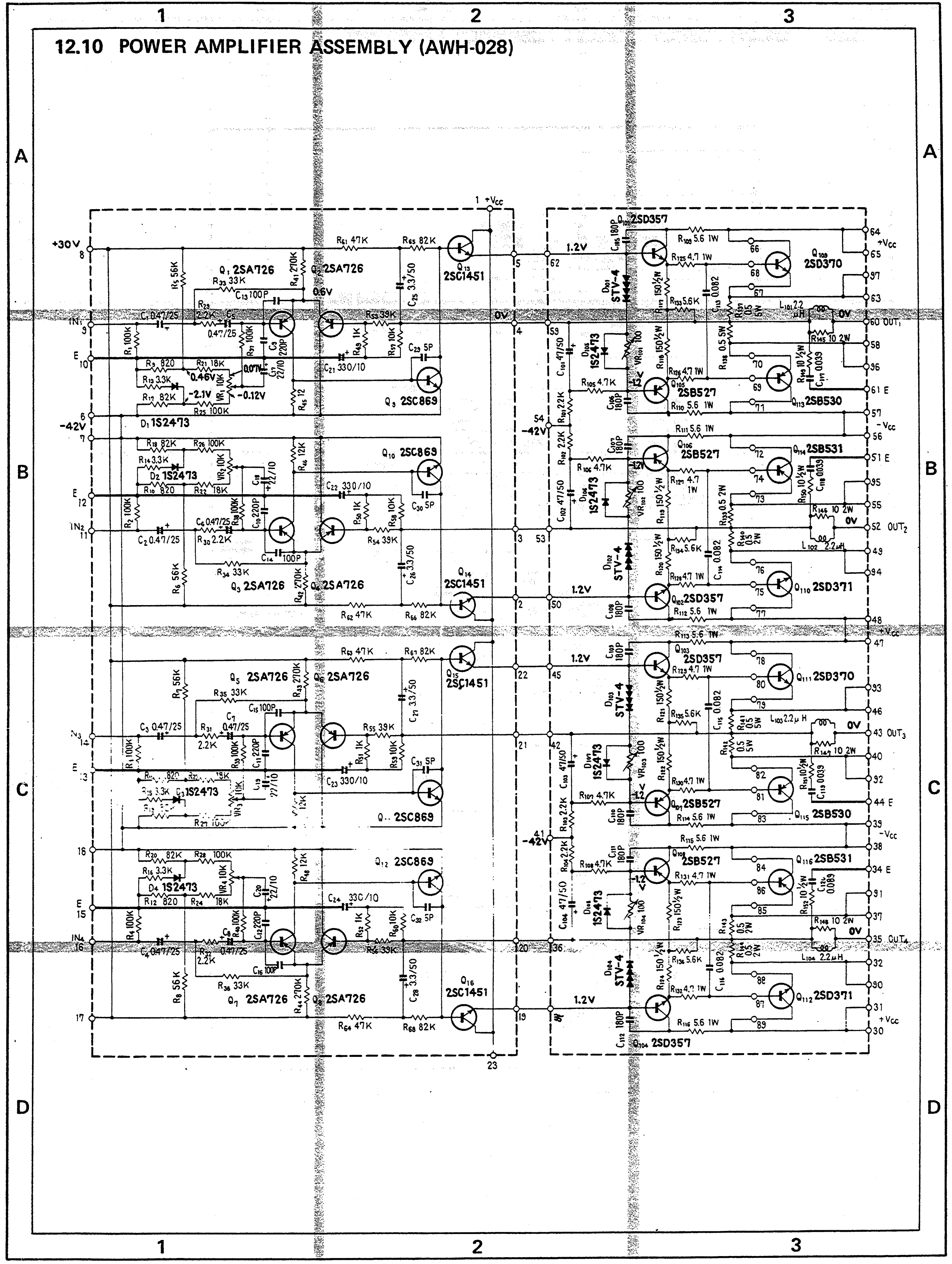
SEMICONDUCTORS

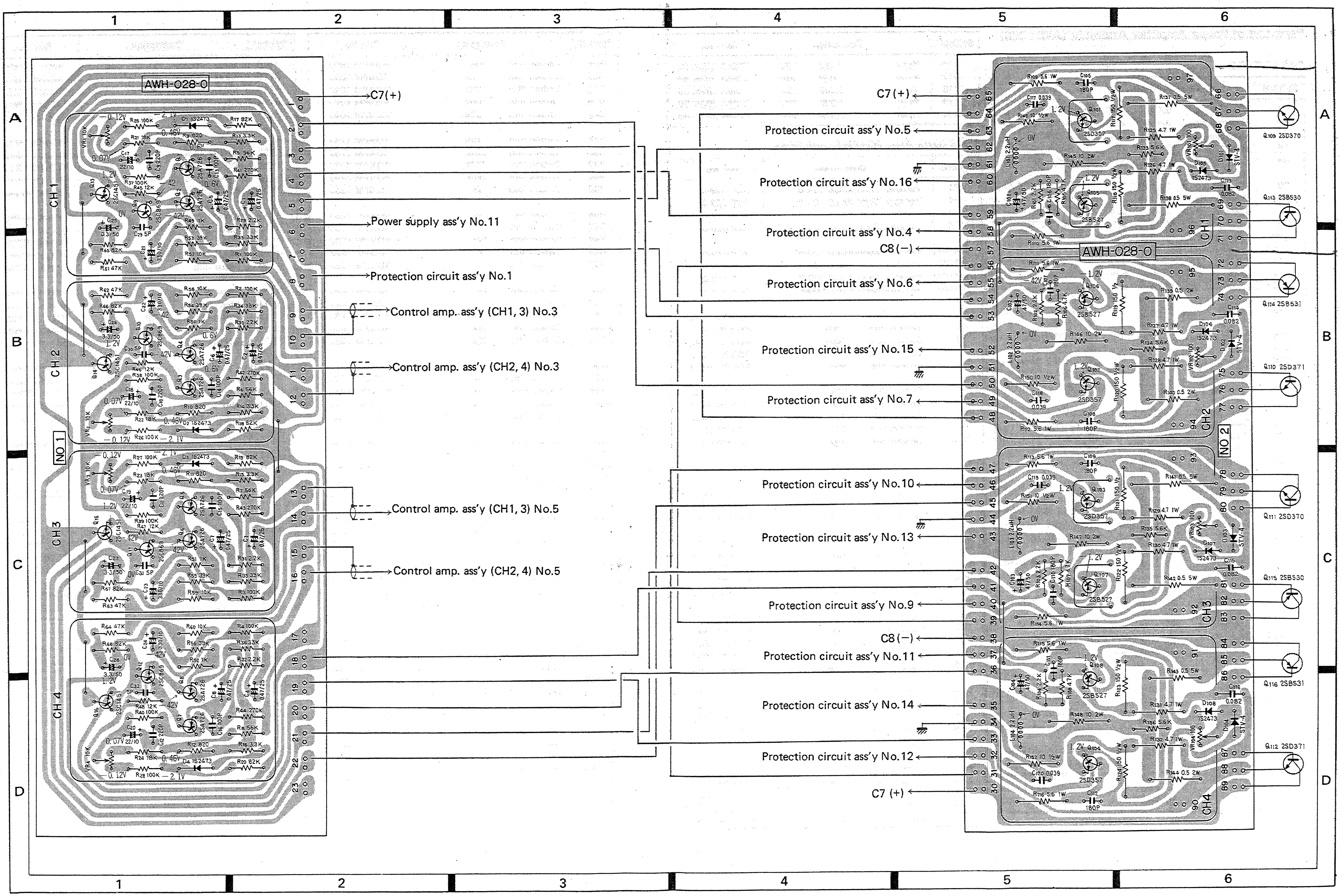
Symbol	Description	Part No.
Q1	Transistor 2SD525-O or Y	
Q2	Transistor 2SC1318A-Q or R	
Q3	Transistor 2SC945-Q or R	
Q4	Transistor 2SD313-D or E	
Q5	Transistor 2SB507P-D or E	
Q6	Transistor 2SA720A-Q or R	
D1	Diode SS3R	
D2	Diode SS3R	
D3	Diode SS3	
D4	Diode SS3	
D5	Diode SIB01-02 (1S1886)	
D6	Diode SIB01-02 (1S1886)	
D7	Diode SIB01-02 (1S1886)	
D8	Diode SIB01-01 (1S1885)	
DZ1	Zener diode WZ-140	
DZ2	Zener diode WZ-130	

OTHERS

Symbol	Description	Part No.
	Heat sink	ANH-263
	Heat sink	ANH-117
	Fuse clip	AKR-013

12.10 POWER AMPLIFIER ASSEMBLY (AWH-028)


1
2
3
A
B
C
D
+30V
-42V
IN₁
IN₂
IN₄
OUT₁
OUT₂
OUT₃
OUT₄
+Vcc
-Vcc
1.2V
0V
0.6V
0.46V
-2.1V
-0.12V
Q₁ 2SA726
2SA726
Q₃ 2SA726
Q₅ 2SA726
Q₇ 2SA726
Q₉ 2SC869
Q₁₀ 2SC869
Q₁₁ 2SC869
Q₁₂ 2SC869
Q₁₃ 2SC1451
Q₁₄ 2SC1451
Q₁₅ 2SC1451
Q₁₆ 2SC1451
2SD357
2SB527
2SD370
2SB530
2SB531
2SD371
STV-4
1S2473
D₁ 1S2473
D₂ 1S2473
D₄ 1S2473
L₁₀₁ 2.2μH
L₁₀₂ 2.2μH
L₁₀₃ 2.2μH
L₁₀₄ 2.2μH
23


AWH-028-0
NO 1
NO 2
CH 1
CH 2
CH 3
CH 4
C7(+)
Power supply ass'y No.11
Protection circuit ass'y No.1
Control amp. ass'y (CH1, 3) No.3
Control amp. ass'y (CH2, 4) No.3
Control amp. ass'y (CH1, 3) No.5
Control amp. ass'y (CH2, 4) No.5
C7(+)
Protection circuit ass'y No.5
Protection circuit ass'y No.16
Protection circuit ass'y No.4
C8(−)
Protection circuit ass'y No.6
Protection circuit ass'y No.15
Protection circuit ass'y No.7
Protection circuit ass'y No.10
Protection circuit ass'y No.13
Protection circuit ass'y No.9
C8(−)
Protection circuit ass'y No.11
Protection circuit ass'y No.14
Protection circuit ass'y No.12
C7 (+)
Q109 2SD370
Q113 2SB530
Q114 2SB531
Q110 2SD371
Q111 2SD370
Q115 2SB530
Q116 2SB531
Q112 2SD371
1
2
3
4
5
6
A
B
C
D

Parts List of Power Amplifier Assembly (AWH-028)

CAPACITORS

Symbol	Description	Part No.
C1	Electrolytic 0.47 25V	CSSA R47M 25
C2	Electrolytic 0.47 25V	CSSA R47M 25
C3	Electrolytic 0.47 25V	CSSA R47M 25
C4	Electrolytic 0.47 25V	CSSA R47M 25
C5	Electrolytic 0.47 25V	CSSA R47M 25
C6	Electrolytic 0.47 25V	CSSA R47M 25
C7	Electrolytic 0.47 25V	CSSA R47M 25
C8	Electrolytic 0.47 25V	CSSA R47M 25
C9	Ceramic 220p 50V	CCDSL 221K 50
C10	Ceramic 220p 50V	CCDSL 221K 50
C11	Ceramic 220p 50V	CCDSL 221K 50
C12	Ceramic 220p 50V	CCDSL 221K 50
C13	Ceramic 100p 50V	CCDSL 101K 50
C14	Ceramic 100p 50V	CCDSL 101K 50
C15	Ceramic 100p 50V	CCDSL 101K 50
C16	Ceramic 100p 50V	CCDSL 101K 50
C17	Electrolytic 22 10V	CEA 220P 10
C18	Electrolytic 22 10V	CEA 220P 10
C19	Electrolytic 22 10V	CEA 220P 10
C20	Electrolytic 22 10V	CEA 220P 10
C21	Electrolytic 330 10V	CEA 331P 10
C22	Electrolytic 330 10V	CEA 331P 10
C23	Electrolytic 330 10V	CEA 331P 10
C24	Electrolytic 330 10V	CEA 331P 10
C25	Electrolytic 3.3 50V	CEA 3R3P 50
C26	Electrolytic 3.3 50V	CEA 3R3P 50
C27	Electrolytic 3.3 50V	CEA 3R3P 50
C28	Electrolytic 3.3 50V	CEA 3R3P 50
C29	Ceramic 5p 50V	CCDSL 050D 50
C30	Ceramic 5p 50V	CCDSL 050D 50
C31	Ceramic 5p 50V	CCDSL 050D 50
C32	Ceramic 5p 50V	CCDSL 050D 50
C101	Electrolytic 47 50V	CEA 470P 50
C102	Electrolytic 47 50V	CEA 470P 50
C103	Electrolytic 47 50V	CEA 470P 50
C104	Electrolytic 47 50V	CEA 470P 50
C105	Ceramic 180p 50V	CCDSL 181K 50
C106	Ceramic 180p 50V	CCDSL 181K 50
C107	Ceramic 180p 50V	CCDSL 181K 50
C108	Ceramic 180p 50V	CCDSL 181K 50
C109	Ceramic 180p 50V	CCDSL 181K 50
C110	Ceramic 180p 50V	CCDSL 181K 50
C111	Ceramic 180p 50V	CCDSL 181K 50
C112	Ceramic 180p 50V	CCDSL 181K 50
C113	Mylar 0.082 50V	CQMA 823K 50
C114	Mylar 0.082 50V	CQMA 823K 50
C115	Mylar 0.082 50V	CQMA 823K 50
C116	Mylar 0.082 50V	CQMA 823K 50
C117	Mylar 0.039 50V	CQMA 393K 50
C118	Mylar 0.039 50V	CQMA 393K 50
C119	Mylar 0.039 50V	CQMA 393K 50
C120	Mylar 0.039 50V	CQMA 393K 50

RESISTORS AND POTENTIOMETERS

Symbol	Description	Part No.
VR1	Variable (Semi-fixed) 10k-B	ACP-029-0
VR2	Variable (Semi-fixed) 10k-B	ACP-029-0
VR3	Variable (Semi-fixed) 10k-B	ACP-029-0
VR4	Variable (Semi-fixed) 10k-B	ACP-029-0
VR101	Variable (Semi-fixed) 100-B	ACP-019-0
VR102	Variable (Semi-fixed) 100-B	ACP-019-0
VR103	Variable (Semi-fixed) 100-B	ACP-019-0
VR104	Variable (Semi-fixed) 100-B	ACP-019-0
R1	Carbon film 100k	RD¼PM 104J
R2	Carbon film 100k	RD¼PM 104J
R3	Carbon film 100k	RD¼PM 104J
R4	Carbon film 100k	RD¼PM 104J
R5	Carbon film 56k	RD¼PM 563J
R6	Carbon film 56k	RD¼PM 563J
R7	Carbon film 56k	RD¼PM 563J
R8	Carbon film 56k	RD¼PM 563J
R9	Carbon film 820	RD¼PM 821J
R10	Carbon film 820	RD¼PM 821J
R11	Carbon film 820	RD¼PM 821J
R12	Carbon film 820	RD¼PM 821J
R13	Carbon film 3.3k	RD¼PM 332J
R14	Carbon film 3.3k	RD¼PM 332J
R15	Carbon film 3.3k	RD¼PM 332J
R16	Carbon film 3.3k	RD¼PM 332J
R17	Carbon film 82k	RD¼PM 823J
R18	Carbon film 82k	RD¼PM 823J
R19	Carbon film 82k	RD¼PM 823J
R20	Carbon film 82k	RD¼PM 823J
R21	Carbon film 18k	RD¼PM 183J
R22	Carbon film 18k	RD¼PM 183J
R23	Carbon film 18k	RD¼PM 183J
R24	Carbon film 18k	RD¼PM 183J
R25	Carbon film 100k	RD¼PM 104J
R26	Carbon film 100k	RD¼PM 104J
R27	Carbon film 100k	RD¼PM 104J
R28	Carbon film 100k	RD¼PM 104J
R29	Carbon film 2.2k	RD¼PM 222J
R30	Carbon film 2.2k	RD¼PM 222J
R31	Carbon film 2.2k	RD¼PM 222J
R32	Carbon film 2.2k	RD¼PM 222J
R33	Carbon film 33k	RD¼PM 333J
R34	Carbon film 33k	RD¼PM 333J
R35	Carbon film 33k	RD¼PM 333J
R36	Carbon film 33k	RD¼PM 333J
R37	Carbon film 100k	RD¼PM 104J
R38	Carbon film 100k	RD¼PM 104J
R39	Carbon film 100k	RD¼PM 104J
R40	Carbon film 100k	RD¼PM 104J
R41	Carbon film 270k	RD¼PM 274J
R42	Carbon film 270k	RD¼PM 274J
R43	Carbon film 270k	RD¼PM 274J
R44	Carbon film 270k	RD¼PM 274J
R45	Carbon film 12k	RD¼PM 123J
R46	Carbon film 12k	RD¼PM 123J
R47	Carbon film 12k	RD¼PM 123J
R48	Carbon film 12k	RD¼PM 123J
R49	Carbon film 1k	RD¼PM 102J
R50	Carbon film 1k	RD¼PM 102J
R51	Carbon film 1k	RD¼PM 102J
R52	Carbon film 1k	RD¼PM 102J
R53	Carbon film 39k	RD¼PM 393J
R54	Carbon film 39k	RD¼PM 393J
R55	Carbon film 39k	RD¼PM 393J
R56	Carbon film 39k	RD¼PM 393J
R57	Carbon film 10k	RD¼PM 102J
R58	Carbon film 10k	RD¼PM 102J
R59	Carbon film 10k	RD¼PM 103J
R60	Carbon film 10k	RD¼PM 103J
R61	Carbon film 47k	RD¼PM 473J
R62	Carbon film 47k	RD¼PM 473J
R63	Carbon film 47k	RD¼PM 473J
R64	Carbon film 47k	RD¼PM 473J
R65	Carbon film 82k	RD¼PM 823J
R66	Carbon film 82k	RD¼PM 823J
R67	Carbon film 82k	RD¼PM 823J
R68	Carbon film 82k	RD¼PM 823J
R101	Carbon film 2.2k	RD¼PM 222J
R102	Carbon film 2.2k	RD¼PM 222J
R103	Carbon film 2.2k	RD¼PM 222J
R104	Carbon film 2.2k	RD¼PM 222J
R105	Carbon film 4.7k	RD¼PM 472J
R106	Carbon film 4.7k	RD¼PM 472J
R107	Carbon film 4.7k	RD¼PM 472J
R108	Carbon film 4.7k	RD¼PM 472J
R109	Metal film 5.6 1W	RN1H 5R6K
R110	Metal film 5.6 1W	RN1H 5R6K
R111	Metal film 5.6 1W	RN1H 5R6K
R112	Metal film 5.6 1W	RN1H 5R6K
R113	Metal film 5.6 1W	RN1H 5R6K
R114	Metal film 5.6 1W	RN1H 5R6K
R115	Metal film 5.6 1W	RN1H 5R6K
R116	Metal film 5.6 1W	RN1H 5R6K
R117	Carbon film 150 ½W	RD½PS 151J
R118	Carbon film 150 ½W	RD½PS 151J
R119	Carbon film 150 ½W	RD½PS 151J
R120	Carbon film 150 ½W	RD½PS 151J
R121	Carbon film 150 ½W	RD½PS 151J
R122	Carbon film 150 ½W	RD½PS 151J
R123	Carbon film 150 ½W	RD½PS 151J
R124	Carbon film 150 ½W	RD½PS 151J
R125	Metal film 4.7 1W	RN1H 4R7K
R126	Metal film 4.7 1W	RN1H 4R7K
R127	Metal film 4.7 1W	RN1H 4R7K
R128	Metal film 4.7 1W	RN1H 4R7K
R129	Metal film 4.7 1W	RN1H 4R7K
R130	Metal film 4.7 1W	RN1H 4R7K
R131	Metal film 4.7 1W	RN1H 4R7K
R132	Metal film 4.7 1W	RN1H 4R7K
R133	Carbon film 5.6k	RD¼PM 562J
R134	Carbon film 5.6k	RD¼PM 562J
R135	Carbon film 5.6k	RD¼PM 562J
R136	Carbon film 5.6k	RD¼PM 562J
R137	Wire wound 0.5 5W	RT5B 0R5K
R138	Wire wound 0.5 5W	RT5B 0R5K
R139	Metal film 0.5 2W	RN2H 0R5K
R140	Metal film 0.5 2W	RN2H 0R5K
R141	Wire wound 0.5 5W	RT5B 0R5K
R142	Wire wound 0.5 5W	RT5B 0R5K
R143	Metal film 0.5 2W	RN2H 0R5K
R144	Metal film 0.5 2W	RN2H 0R5K
R145	Metal oxide 10 2W	RS2P 100J
R146	Metal oxide 10 2W	RS2P 100J
R147	Metal oxide 10 2W	RS2P 100J
R148	Metal oxide 10 2W	RS2P 100J
R149	Carbon film 10 ½W	RD½PS 100J
R150	Carbon film 10 ½W	RD½PS 100J
R151	Carbon film 10 ½W	RD½PS 100J
R152	Carbon film 10 ½W	RD½PS 100J

SEMICONDUCTORS

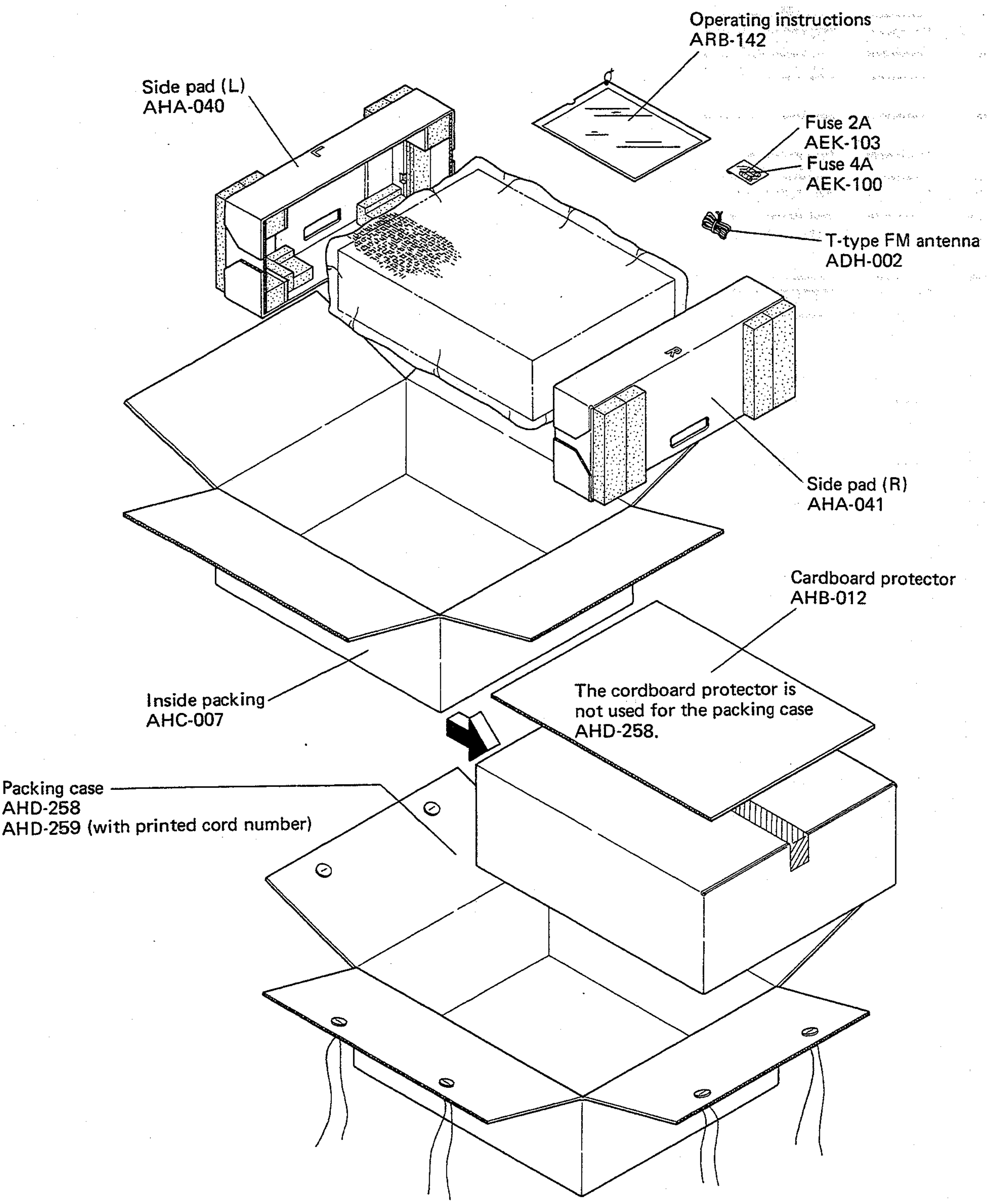
Symbol	Description	Part No.
Q1	Transistor 2SA726-G or F	
Q2	Transistor 2SA726-G or F	
Q3	Transistor 2SA726-G or F	
Q4	Transistor 2SA726-G or F	
Q5	Transistor 2SA726-G or F	
Q6	Transistor 2SA726-G or F	
Q7	Transistor 2SA726-G or F	
Q8	Transistor 2SA726-G or F	
Q9	Transistor 2SC869-C or D	
Q10	Transistor 2SC869-C or D	

Symbol	Description		Part No.
Q11	Transistor	2SC869-C or D	
Q12	Transistor	2SC869-C or D	
Q13	Transistor	2SC1451-V, B or S	
Q14	Transistor	2SC1451-V, B or S	
Q15	Transistor	2SC1451-V, B or S	
Q16	Transistor	2SC1451-V, B or S	
Q101	Transistor	2SD357-C or D	
Q102	Transistor	2SD357-C or D	
Q103	Transistor	2SD357-C or D	
Q104	Transistor	2SD357-C or D	
Q105	Transistor	2SB527-C or D	
Q106	Transistor	2SB527-C or D	
Q107	Transistor	2SB527-C or D	
Q108	Transistor	2SB527-C or D	
D1	Diode	1S2473	
D2	Diode	1S2473	
D3	Diode	1S2473	
D4	Diode	1S2473	
D101	Varistor	STV-4H	
D102	Varistor	STV-4H	
D103	Varistor	STV-4H	
D104	Varistor	STV-4H	
D105	Diode	1S2473	
D106	Diode	1S2473	
D107	Diode	1S2473	
D108	Diode	1S2473	

COILS

Symbol	Description		Part No.
L101	AF choke coil	2.2μH	T63-009
L102	AF choke coil	2.2μH	T63-009
L103	AF choke coil	2.2μH	T63-009
L104	AF choke coil	2.2μH	T63-009

13. PACKING


Operating instructions
ARB-142
Side pad (L)
AHA-040
Fuse 2A
AEK-103
Fuse 4A
AEK-100
T-type FM antenna
ADH-002
Side pad (R)
AHA-041
Cardboard protector
AHB-012
The cordboard protector is not used for the packing case AHD-258.
Inside packing
AHC-007
Packing case
AHD-258
AHD-259 (with printed cord number)

14. PARTS LIST OF EXPLODED VIEWS

Parts No.	Parts Name
AAA-023	Knob
AAB-065	Knob
AAB-079	Knob
AAB-080	Knob
AAD-055	Knob
AAD-108	Knob
AAE-007	Coupler
AAE-008	Coupler
AAF-036	Dial Pointer Ass.
AAG-094	Dial Scale Plaet
AAW-021	4-Ch. Level Indicator
AAW-046	AM-FM Meter
ABA-002	Screw M3x8
ABA-010	Screw M4x15
ABA-012	Screw M4x8
ACH-029	Ele. Capacitor
ACT-008	Variable Resistor
ACV-017	Variable Resistor
ACV-110	Variable Resistor
ACV-310	Variable Resistor
ADG-004	AC Power Cord
ADH-002	T-Type FM Antenna
AEB-027	Rubber Cap
AEB-042	Rubber Bracket
AEB-043	Rubber Bracket
AEB-044	Rubber Bracket
AEC-017	Pulley
AEC-027	Foot
AEC-076	Insulator Wafer
AEC-079	Strain Relief
AEC-101	Pulley
AEC-110	Switch Cover Ass.
AEC-111	Insulator
AEC-119	Sponge
AEC-120	Shading Ring
AEC-121	Acrylic Bracket
AEE-009	Insulator
AEK-100	Fuse 4A
AEK-101	Fuse 3A
AEK-103	Fuse 2A
AEK-106	Fuse 1A
AEL-015	Lamp (8V 300mA)
AEL-022	Lamp (8V 50mA)
AEL-025	Lamp (6V 30mA)
AHA-040	Side Pad (L)
AHA-041	Side Pad (R)
AHB-012	Cardboard Protector
AHC-007	Inside Packing
AHD-258	Packing Case

Parts No.	Parts Name
AHD-259	Packing Case
AKA-004	Ant. Terminal Board
AKB-014	Phono Jack A (4P)
AKB-015	Phono Jack B (4P)
AKB-019	Phono Jack 1P
AKE-010	Output Terminal (for Speaker)
AKE-016	Output Terminal (for Speaker)
AKE-017	Screw (for Ground Terminal)
AKH-001	Transistor Socket
AKK-002	Lamp Socket
AKM-006	Multi Plug
AKN-002	Phone Jack
AKP-005	AC Socket
AKP-006	Multi Socket
AKR-027	Fuse Holder
ALA-006	Boss
AMM-037	Wooden Cabinet Ass.
ANB-326	Front Panel Ass.
ARB-142	Operating Instruction
ASC-066	Rotary Switch
ASC-067	Rotary Switch
ASF-001	Micro Switch
ASG-070	Push Switch
ASG-078	Push Switch
ASG-079	Push Switch
ASG-080	Push Switch
ASH-013	Slide Switch
ASR-007	Relay
ATB-041	Bar-Antenna
ATT-242	Power Transformer
AWE-056	Tuner Ass.
AWG-024	Control Amp. Ass.
AWH-028	Power Amp. Ass.
AWM-076	CD-4 Ass.
AWM-077	SQ/RM Decoder Ass.
AWM-079	Protection Ass.
AWR-086	Power Supply Ass.
AWS-087	Switch Ass.
AWX-052	Lamp Board Ass.
AWX-054	Headphone Jack Ass.
AXA-015	Tuning Drum Ass.
AXA-039	Tuning Shaft Ass.
AXB-001	Antenna Holder Ass.
B21-011	Washer
B22-014	Washer 7mm
B22-016	Washer 9mm
B71-004	Nut 9mm
B71-010	Nut 7mm
E22-032	Lamp 8V 300mA
M49-025	Pulley Shaft

Parts No.	Parts Name
T22-025	Ferrite Balun
2SB530	Transistor
2SB531S	Transistor
2SD370	Transistor
2SD371S	Transistor